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Books



Der Durchbruch, Studie an Hand der Vorgänge des Weltkrieges
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Through the Fog of War.—*By B. H. Liddell Hart*

Lee, Grant, and Sherman.—*By Lieut. Colonel Alfred H. Burne*

Official History of the Great War. Military Operations in France
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Imperial Japan, 1926-1938.—*By A. Morgan Young*

Far Eastern Policy of the United States.—*By A. Whitney
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The Forgotten Peace, Brest-Litovsk, March, 1918.—*By John W.
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Naval Documents.—*Compiled by Captain Dudley Knox*

Twenty Years' Armistice 1918-1938.—*By William Orton*

When There is No Peace.—*By Hamilton Fish Armstrong*

Unconquered.—*By James Bertram*

Periodical
Section /



Comments on the contents of the books listed here may be
found on page 79 following

Periodical
Section

Contents

	PAGE
EMPLOYMENT OF SUPPORTING ARMS IN THE SPANISH CIVIL WAR	5
MILITARY NEWS AROUND THE WORLD	22
THE SPANISH CIVIL WAR	38
THE SINO-JAPANESE WAR	43
FOREIGN MILITARY DIGESTS	49
Digests of important articles from foreign military periodicals; the remaining articles for each magazine are listed.	
<i>Japanese Bombardment Aviation</i>	49
<i>Tactics and Technique of the Air Forces in the Spanish Civil War</i>	54
<i>Lessons of the Spanish War</i>	61
<i>Infantry in the Breakthrough</i>	62
<i>Preparation of Tank Attacks</i>	67
<i>French Principles for the Employment of Mechanized and Motorized Units and the Defense Against These Units (I)</i>	68
<i>Russian Principles for the Employment of Tank and Motorized Units and the Defense Against These Units (I)</i>	73
BOOK REVIEWS AND READING COURSE FOR OFFICERS	79
LIBRARY BULLETIN	85
Books, recently accessioned, which are of particular significance.	
ACADEMIC NOTES, C. & G.S.S.	86
Current School material, which affects instructional procedure or tactical doctrines.	
<i>Division Artillery in Development and Attack</i>	86
<i>Division Engineers—Characteristics, Organization and Equipment</i>	92
DIRECTORY OF PERIODICALS	97
CATALOG OF SELECTED PERIODICAL ARTICLES	97
A systematic review of the contents of selected military periodicals. Foreign-language periodicals are digested to a degree to furnish an adequate idea of contents and significance.	
READERS' GUIDE AND SUBJECT INDEX	120
All subject-headings are arranged in alphabetic sequence and can be consulted like a dictionary. Note also List of Periodicals Indexed and Key to Abbreviations.	

Mission

The object of this publication is a systematic review of current military literature, through cataloging articles of professional value, in selected military and naval periodicals, in the domestic and foreign field.

Articles from foreign periodicals are treated by translations of titles and digests of contents; material of particular importance is covered more extensively in a section of "Foreign Military Digests."

A "Library Bulletin" Section lists books, recently accessioned, which are of particular significance.

This *Quarterly* is published as a guide to modern military tendencies and to inspire vigorous thoughts on the subjects treated.

The opinions expressed by authors are not necessarily official.

Acknowledgment

The editors of the *Quarterly* desire to express their thanks and appreciation to the many persons who have valuably assisted in the preparation of material for this issue. The work of contributors has been done in addition to their other duties and on their own time. We are very grateful to the following officers for their generous donations:

MAJOR G.J. BRAUN: *Militär-Wochenblatt* (20, 27 May, 3, 10, 17, 24 June 1938).

COLONEL L.H. BRERETON: *Revue de l'Armée de l'Air* (August 1938).

LIEUTENANT J. DASHER: *Krasnaya Zvezda* (18 August-23 October 1938, incl.)

MAJOR R.T. GUTHRIE: "Division Artillery in Development and Attack."

LIEUT. COLONEL L.E. OLIVER: "Division Engineers—Characteristics, Organization and Equipment."

CAPTAIN H. N. HARTNESS: *Die Kraftfahrkampftruppe* (July, August, September 1938).

LIEUTENANT F. HENRIKSEN: *Wehrtechnische Monatshefte* (July 1938).

LIEUT. COLONEL L.W. HILLIARD: *Revue Militaire Suisse* (July, August, September 1938).

CAPTAIN W.G. JOHNSON: "Employment of Supporting Arms in the Spanish Civil War."

MAJOR T.R. PHILLIPS: *La France Militaire* (27 July, 1, 7 & 8, 18, 28 August, 1, 16 September 1938); *Revue Militaire Générale* (July, August, September 1938).

LIEUTENANT J.W. RUDOLPH: Book Reviews.

MAJOR L.K. TRUSCOTT, JR: *Revue de Cavalerie* (September-October 1938).

The Cover

Antiaircraft guns in night firing practice by the 63d Coast Artillery (A.A.) at the Presidio of San Francisco, California.

Photograph by Pictures Incorporated, New York.



Wide World Photos.

The Employment of Supporting Arms in the Spanish Civil War

BY CAPTAIN WENDELL G. JOHNSON, *Infantry*

"Technical means have not displaced strategy and tactics; on the contrary, by permitting new combinations, they have increased their scope. It is, therefore, necessary more than ever that the command and staff possess a clear-cut knowledge of the actual possibilities of tanks and motorization and of the conditions essential to guarantee their successful use in the battlefield."

(General A. Niessel, French Army, *Revue Militaire Generale*, December 1938.)

The art of waging war changes little but the methods and means used in each new war invariably differ from the past. They are modified because the theater of operations, the contending forces, the strategic objectives, and the available tools are changed. So it is with the war in Spain. It is the purpose of this study to examine the use of the arms supporting infantry in this war, considering especially how and why certain of these arms have been employed differently than in the past.

A comprehensive and accurate study of how the various arms are employed in a war currently being waged is difficult to make, owing to the paucity of source material and exact data pertaining specifically to these arms. When they have a war to win generals give out little information. Much of the information obtainable is not first-hand evidence,

and much carries the distortion of several tellings, of considerable personal bias, and frequently the exaggeration or minimization of censorship and propaganda. For these reasons we must carefully evaluate all documentation, consider the pertinent and extraneous factors involved, and above all avoid drawing premature conclusions.

However, if the available records, reports, dispatches, and communiques, are judiciously considered along with writings purporting to be based on personal experiences and observations, there is much to be learned from every armed conflict, even before complete particulars become available. Even though new ideas cannot always be obtained, one can still learn by examining the application of old established principles in a new field.

PERTINENT LOCAL FACTORS

The local factors bearing on the Spanish War are extremely complex. Too complex, in fact, for detailed discussion here, yet of such influence on the character of military operations that the more important ones must be mentioned.

First, we must remember that while this conflict has taken on many aspects of an international war, it began as a purely civil war. A coalition of right or conservative elements and another of widely differing left-wing and radical elements have been fighting for complete control of their common country. Neither one wants to destroy or devastate it.

The Government has been torn by internal dissention and economic revolution and therefore has lacked unity of purpose, coordinated action and strong central control. It is little wonder it has been incapable of decisive offensive action.

The ideologies and motives of the opposing factions did not separate them into sectional areas as was the case in the American Civil War. In the territory occupied by each side there are many sympathizers of the other. This has influenced the character of the war. It may have deterred the belligerents from using gas and from bombing civilians—which actually appears seldom to have been done intentionally, in spite of what we read. It caused everyone to be a suspect, provoked false denunciations and murders. It facilitated espionage. Yet while individuals have ravaged, murdered, and devastated, the policy of the high commands seems to have tended toward the least practicable destructive action.

The intervention of foreign powers has had diverse effects on the war. It gave each side a slogan or war cry to stimulate its combatants: "Drive out the invaders of our land." It also made the peninsula a proving ground for new theories and new weapons. It gave European rivals a chance to test their doctrines and combat means against those of potential enemies. It brought about partly kept non-intervention agreements which have complicated rather than simplified the course of the war. The effects are innumerable.

Terrain has been a considerable factor—politically and economically, strategically and tactically. Politically, it is responsible for sectional clannishness and separatist aspirations, and has thereby handicapped centralization of authority. Economically and strategically it has influenced the selection of objectives. In the tactical sphere—our primary interest—terrain means roads, railroads, mountains, hills, plains, woods, streams, observation, fields of fire, cover, concealment. Spain is a mountainous country. In the several theaters of operation the terrain generally has been rugged and often mountainous. Between the mountains and vast plateaus run occasional rivers whose valleys are the natural routes of military operations. Northwest Spain is heavily wooded; other sections are not. The road net in Spain is not extensive. The main roads are good but far apart. Other roads are mere cart tracks. There are few railway lines, therefore motor transport has been used extensively for movements of troops as well as supplies. Ground observation is favored in most provinces by the accidented, treeless landscape. Concealment of course, is lacking, except as afforded by ground forms. On the whole the peninsula is

difficult country to fight in, but it favors defense more than attack.

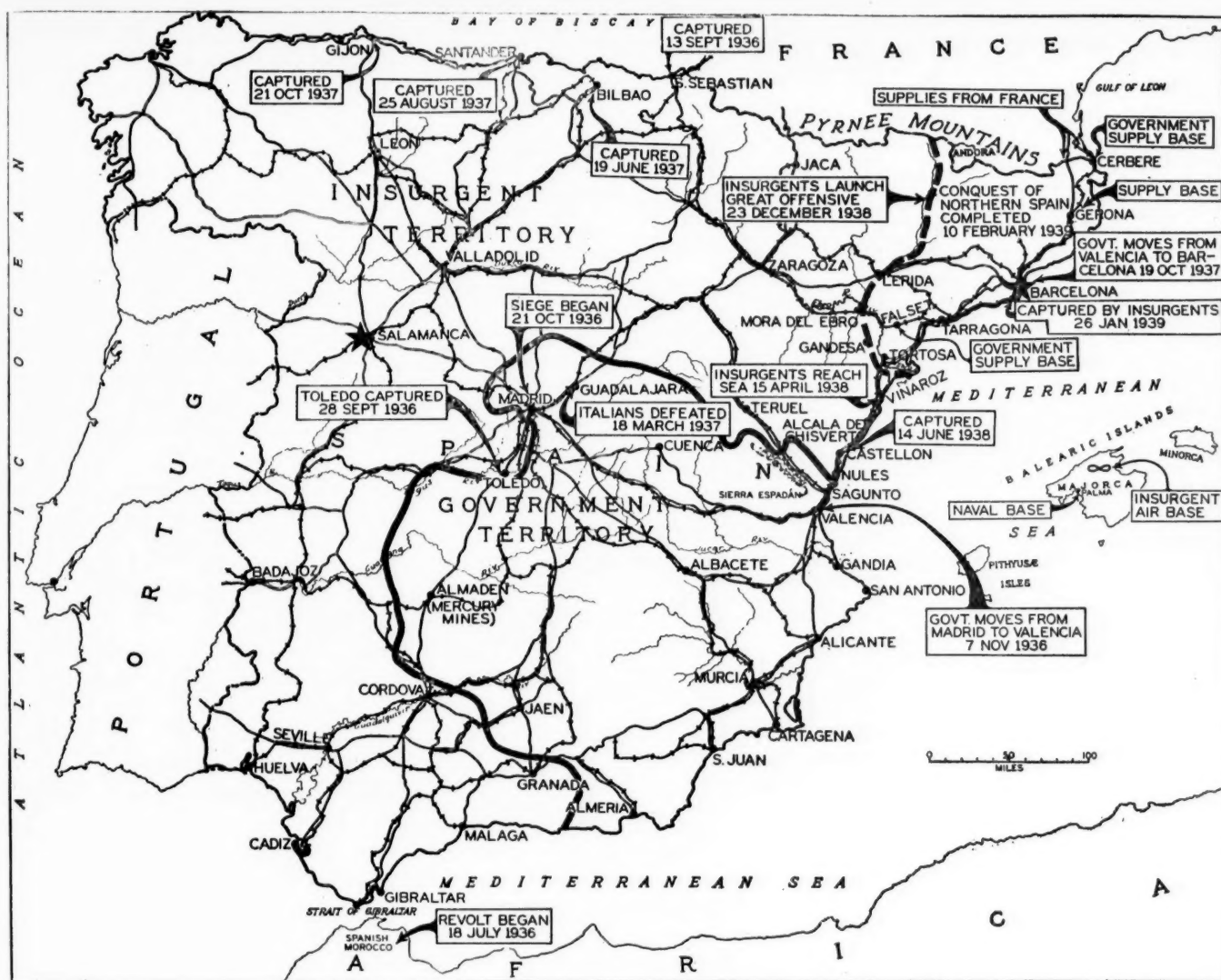
There were no strong mobilized armies ready to clash with each other in July 1936. Both sides started out with almost nothing. Let us look at the pre-war Spanish army and what happened to it following 17 July, 1936.

The Insurgent uprising came when the Spanish army had been reduced almost to impotence. The theoretical strength of the army was 145,000 men, but probably no more than 100,000 were actually in service, and 34,000 of these were legionnaires, regulars, and native troops stationed in Morocco. In the army on the peninsula, companies numbered 50 men or less and battalions probably no more than 200. Except for the noncoms, the men were one-year conscripts. The authorized eight infantry divisions, the cavalry division, and the two mountain brigades were mere skeletons. The two tank regiments had some 120 obsolescent or obsolete tanks. The combined military and naval air forces had around 200 obsolescent planes useable for military purposes.⁽¹⁾

The well trained forces in Morocco went over to the insurgent cause. The majority of troops on the peninsula remained loyal to the Popular Front government but were so scattered and broken up by the effect of the revolution that they were ineffective as formed units. Roughly 90 per cent of the 10,000 active officers, and several thousand more who had been retired by the government, turned rebel. Several hundred were killed or captured. Thus the peninsular army disintegrated and the government was left with very few trained commanders, especially of small units. The 30,000-odd Civil Guards, ex-soldiers all, split more or less equally between the two camps; likewise the police and customs guards. As a result we find the Insurgents had a small trained force of some 34,000 men in Morocco, several detachments on the peninsula, and plenty of officers to organize and command recruited falangists and requetes (members of Fascist and Carlist parties), while the Government had only the remnants of the army and various police units and undisciplined party militiamen. However, the bulk of the artillery, airplanes, and small-arms stock remained in government hands.⁽¹⁾ And they also held the gold of the Spanish treasury and the money and valuables confiscated from private deposits with which to buy war material abroad. This, then, was the situation in late July, 1936.

To have the proper perspective of the unique character of the first year or more of this war, one must bear in mind the utter lack of central control and unity of thought existing in the Popular Front regime and throughout territory rendering nominal support to the Madrid Government. The Basque provinces were granted almost complete autonomy. Catalonia was practically a separate state. Many other outlying regions and provinces organized local soviets or home-rule communities and looked upon the distant fighting as little concern of theirs. The little existing authority disintegrated, crimes to people and property multiplied, anarchy gripped the country. In consequence there was no united front against the Nationalist uprising. In each area where there was fighting, the local authorities had to handle the situation

⁽¹⁾ *Les Leçons de la Guerre d'Espagne*, General Duval; *Revue militaire Suisse*; *Bulletin Belge des Sciences Militaires*; *If War Comes*, Dupuy and Eliot.



GENERAL SITUATION AS OF 1 MARCH 1939.

as they could and as they pleased, neither receiving nor giving much help.

It may be said that during the first month or more after 17 July 1936, the war was not a war at all. It was a hodge-podge of violent domestic disturbances. Small detachments representing the opposing causes fought in the streets of dozens of communities. All but a few of these local outbreaks were won by one side or the other within a matter of days or weeks, and the remainder took on the aspect of small wars on widely separated "fronts." As time went by these fronts became loosely joined together by scattered detachments. As a result discontinuous lines eventually became established, which separated territory occupied by Insurgents from that dominated by the Government.

Complete unity of command was achieved by the Insurgents some two months after the commencement of hostilities. General Franco was named by the Burgos Junta to be head of the Insurgent State and commander in chief of the army and navy. As a result, the war on the separate fronts was resolved into a struggle between small but well lead, well trained elements of a unified army on one side, and large, but untrained, undisciplined, uncoordinated militia contingents on the other. The militias were under the orders of

what amounted to numerous separate governments—Madrid, Barcelona, Basque, Asturian . . . Worse than that, many militia units took orders only from leaders of their particular political party or labor union. The Russian injection of political commissars added to the mess. As a result of this dissention and non-cooperation among his sovietized and syndicalistic enemies, General Franco was able to defeat them in detail.

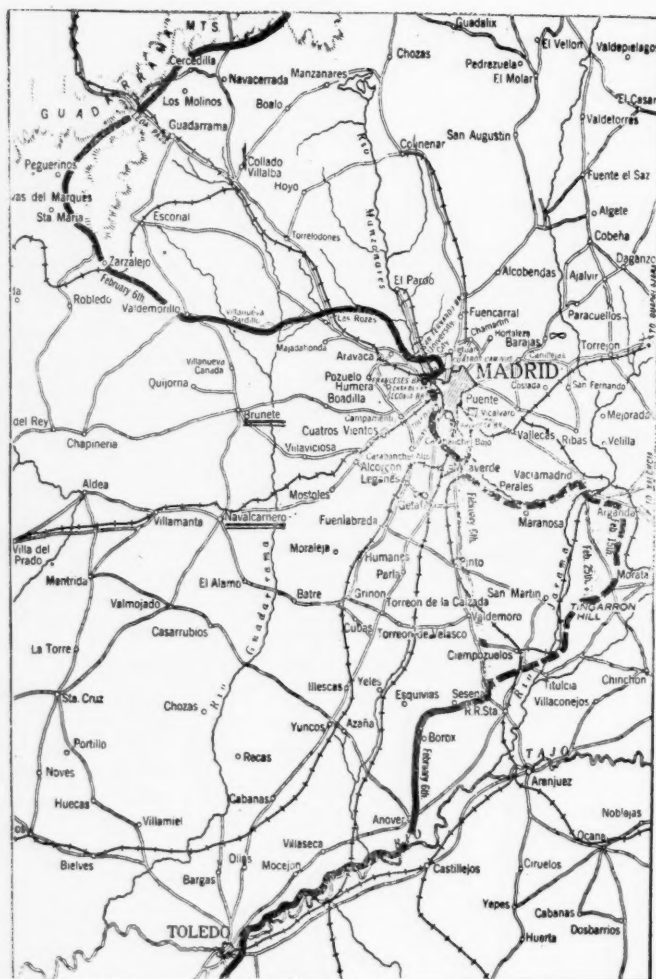
Both sides have been largely dependent on foreign matériel. Without it neither one could have continued fighting for long. They also have had foreign aid in personnel, in about equal amounts, probably a maximum of 50,000 to 60,000 men each or roughly 10 per cent of their respective forces.

SUMMARY OF OPERATIONS

From the outset the main effort of the Insurgents was directed upon the capture of the seat of government at Madrid, with secondary attacks on provincial capitols, ports, and frontier points.

Many of these secondary objectives were taken; the Portuguese frontier and the western part of the French border were secured. Malaga was captured by converging col-

umns in February 1937, but Madrid did not fall. Frontal attacks failing, two outflanking operations were attempted with a view to cutting Madrid's already precarious communications. These—the Jarama River attack of February and the Guadalajara offensive of March, 1937—also failed.



THE SIEGE OF MADRID.

Then Madrid was left as an encumbrance to plague government G-4's—a small insurgent containing force staying to immobilize its garrison—while the main effort was switched to the north for an offensive on the mountainous Basque provinces still remaining unconquered. The conflict now began to look like a real war. Bilbao was captured 19 June after an 80-day offensive. Control was gained of its rich mining region, industries, and port facilities, and the eastern approach to Santander province was opened.

Just as the advance on Santander was getting under way, the Government launched a surprise offensive on Brunete and Navalcarnero, aimed at cutting off the Insurgent salient west of Madrid. This diversion, begun 5 July, forced a suspension of Insurgent operations in the north, but after three weeks of fighting the lines stabilized with half of the Government gains again in Insurgent hands. Then the advance on Santander was renewed, and the city was occupied 25 August. Bad weather for a time held up the conquest of the Asturias west of Santander, but by the end of October

this remaining province in the northwest was added to Insurgent territory.

General Franco now had eliminated three hostile armies—Basque, Santander, and Asturian—had no enemy force in his rear, controlled two-thirds of Spain proper, and was able to concentrate his means for an attack on the Aragon front. This front had been inactive for the entire first year of the war, the Catalan *milicianos* passively letting the Insurgents concentrate and conquer on other fronts without so much as threatening the weak Insurgent detachments occupying the line: Jaca—Huesca—Zaragoza—Teruel. In August 1937, however, the Government launched an unsuccessful attack on Zaragoza and followed it with others in September and October. Several towns were captured, Quinto and Belchite in particular, but there was no great change in the contour of the front. The offensive attitude of the Government forces petered out in the face of growing Insurgent strength in the eastern theater.

Through November and December the Insurgent command was preparing for the Aragon offensive toward the Mediterranean. But before the Insurgents were ready, the other side pulled a surprise attack, 15 December, which enveloped and pinched off the town of Teruel in the nose of the Insurgent salient. Trench fighting ensued. The complexion of the war was changing. Beginning with the battle of Teruel, the war assumed major proportions. It took the Insurgents two months to regain what they had lost, so it wasn't until 9 March, 1938, that their contemplated offensive got started down the Ebro River valley. Five week later, 15 April, the Insurgents had reached the sea at Vinaroz. The enemy was again split in two. This Spanish "Vicksburg" campaign was hailed as a demonstration of what superiority in matériel and modern weapons could achieve when skillfully handled.

Franco elected to turn next on the central army and sever its alimentary canal at Valencia. Three months later his army was within 25 miles of the port city. Then came the Government surprise thrust across the Ebro near Gandesa on 24 July. The Insurgent holding forces fell back from ten to twenty miles before air and ground reinforcements could plug the hole. Once more Franco had to turn from his objective in order to carry out his policy of not giving up what he had once won. Not until 17 November was the Ebro front reestablished as it had been in mid-July.

Instead of shifting his forces back to the Valencia sector, the Generalissimo decided to strike at Barcelona. The first blow fell 23 December. Holes were punched in "soft spots" between the defenses along the Noguera Pallaresa and Segre Rivers, penetrations were widened, strong points outflanked, and the advance converged on the enemy capitol from southwest and west. On 26 January, 1939, the Insurgents entered the capitol of Catalonia and Leftist Spain. Pursuit continued and by 10 February Franco had conquered all Catalonia and had driven the Government Army of the Ebro into neutral France.

In the skillful execution and rapidity of advance, the march through Catalonia more than parallels the 1938 drive to the Mediterranean. However, larger forces and more matériel were committed to this campaign. It is estimated that 300,000 men were concentrated on each side in the Cata-

lan sector. More artillery and more airplanes were in evidence. Whereas the Insurgents hitherto usually have had superiority in material means but inferiority in numerical strength, in this offensive they had equality, if not superiority, in men as well.

THE SUPPORTING ARMS

THE INSURGENT NAVY

Though not a supporting arm, and accordingly not within the scope of this study, the Insurgent navy must be given mention here, for on various occasions it has rendered considerable support to the operations on land. Strategically it has had a broad influence on the course of the war by blockading hostile shipping and partly closing hostile ports. In the tactical sphere it has given direct support to the land forces by fire on enemy positions. For example, it participated in the attack on Malaga, in the conquest of the north coast, and in the offensive on Castellon, Sagunto and Valencia. How effective this support by fire proved to be cannot be determined. It must have had some destructive effect on the coastal roads along which the Government forces were retreating, and no doubt was of considerable moral support to the Insurgent land forces.

CHEMICAL

So far as is known gas has not been used in this struggle.⁽²⁾ Political and humanitarian reasons probably have been the principal deterrent to the use of toxic chemicals. However, since the belligerents are said to have imported thousands of gas masks, it is apparent that precautionary measures against gas attacks have been taken. Does the absence of mustard in Spain have any portent? Will armies in the next war between major powers be loath to initiate gas warfare? One wonders.

SIGNAL

Signal communication has been excellent in the Insurgent army where German technicians are said to have provided and operated the means, but less efficient in the Government army. Radio has been relied upon to a considerable extent, but less extensively for liaison within cavalry, tank, or aircraft units than is contemplated by most modern armies. Few tanks or airplanes carry radio sets—pursuit planes do without wireless communication entirely. One major use of radio is for propaganda purposes. Both sides have powerful stations from which come continual broadcasts for local and foreign listeners. Loud speakers—the *altavoz*—blare across no-mans-land telling the hostile combatants of the villiany of their superiors and virtues of their opponents, of the utopia awaiting deserters and the purgatory in store for the rest.

ENGINEERS

Engineer troops have had their hands full keeping roads open, installing ponton bridges, repairing permanent

bridges, building field works, and supplying fortification material. Labor battalions were used by the Government for constructing field fortifications in Catalonia, and also for building the iron ring of Bilbao. During the battle on the Ebro last summer and fall, bridges behind Government lines were bombed daily, but nightly were repaired by the engineers. In executing demolitions the Government troops have shown especial skill. The Asturian *dinamiteros*, long accustomed to handling explosives in the mines, have efficiently carried out many hazardous assignments, both as pioneers and as grenadiers.



Wide World Photos.

PONTON BRIDGE ERECTED BY INSURGENT ENGINEERS

CAVALRY

Cavalry operations in this conflict have received little mention in either the military or civilian press. However, though not widely advertised, this arm has on many occasions proved its utility when given missions for which its mobility and firepower are suited. Insurgent cavalry, though a minor fraction of Franco's forces, has been better organized and has played a more important part in the war than Government cavalry. It has been used for reconnaissance, security, flanking action, exploitation, pursuit, and mopping up isolated points of resistance.

Neither of the opposing forces disposed of much cavalry at the beginning of the war owing to the disruptive effect which the insurrection had upon the existing units (said to have been ten cavalry regiments). The Insurgents used the intact Moroccan cavalry groups—some 2,000 sabers—as the nucleus for Monasterio's cavalry column, which operated effectively on the right flank of Franco's advance on Madrid. To this unit of five or six squadrons later were added three infantry battalions and three artillery batteries. It became "Monasterio's Brigade." On 6 November it seized and held a position outside Madrid until the infantry came up. In the Jarama River offensive of February, 1937, the brigade made a mounted attack behind tanks and was repulsed with heavy losses.⁽³⁾

Throughout the year 1937, cavalry elements assisted in various operations, particularly in the conquest of Bilbao, Santander, and Gijon, where some five separate squadrons participated. Both Insurgents and Government organized

⁽²⁾In *Air Power in the Next War* J. M. Spaight writes as follows: "The party of British Members of Parliament . . . who visited Spain in November, 1936, stated . . . there was substantial evidence of the use of a small number of gas shells by the Insurgents in the University city at Madrid; they made no mention of the use there or elsewhere of gas bombs, nor were any used later by either side, said Mr. Duncan Sandys in his account in the *Daily Telegraph*, 8th and 9th April, 1938, of his and Mr. Simmonds visit to Spain."

⁽³⁾*Revue Militaire Generale*, October, 1938.

various mounted units but these for the most part were limited to separate troops and squadrons assigned to army corps. Two factors operated to keep either side from creating large cavalry components—lack of horses in Spain, and the reliance placed on motors for mobile operations.

Not until the Insurgent counteroffensive against Teruel in January and February 1938, do we find any indication of a major cavalry operation. From then on there are numerous instances where Monasterio's command—now a mixed division—showed that cavalry is still an important arm, especially in open warfare.

Beginning 5 February, 1938, the Insurgents struck a powerful blow upon the Government salient jutting 15 miles westward into the Sierra Palomera Mountain north of Teruel. While General Aranda's corps kept pressure on the southern flank of the bulge and General Sanchez' division flattened the nose, General Yague's Moroccan division attacked the northern flank. Into the gap opened by the Moroccans and Legionnaires of Africa poured Monasterio's cavalry from its reserve position. It penetrated about ten miles, capturing a town and routing enemy reserves. Threatened in rear by this maneuver, the defense began to collapse. On 6 and 7 February, while the pincers were closing on the salient from north and southwest, the cavalry cut eastward and then south to capture Perales, Alfambra, and Peralejos along the road leading north from Teruel. The cavalry practically cut the entire base of the salient, captured several thousand prisoners and was a big factor in bringing the recapture of Teruel 21 February.

General Yague acclaimed: "A large share of the credit for the success of this operation should go to Monasterio's

cavalry veterans, who demonstrated so well their efficiency in mountain fighting in our northern campaign, and who have again repudiated the doubts some military authorities hold regarding cavalry's usefulness in modern warfare."

This mixed division was active throughout March and April, 1938, in the offensive that broke Government Spain in two. Motorized infantry, armored cars, and tanks had been added to the mounted force. After General Valino's Navarrese division broke the front near Herrera on 9 March, the cavalry went through the gap and played havoc with communications and troops in the rear area. By the 13th it had advanced from 30 to 40 miles. The initial penetration was next to be extended northward by General Yague's corps, supported by the cavalry division. In this operation cavalry mobility was used to cover the crossing of the Ebro and assist the advance on Bujaraloz, then to mop up the remaining resistance north of this town. A few days later when Yague reached the Cinca River on the road to Lerida, cavalry was used to plug a gap created between the Moroccan Corps and Valino's forces to the south of the Ebro.

Again in the breakthrough to the sea, 15 April, Moorish cavalry helped outflank Government resistance. Following this success, the cavalry division is reported to have been used to occupy the coastal zone while other forces were re-disposed for undertaking the southward offensive toward Castellon and Valencia.

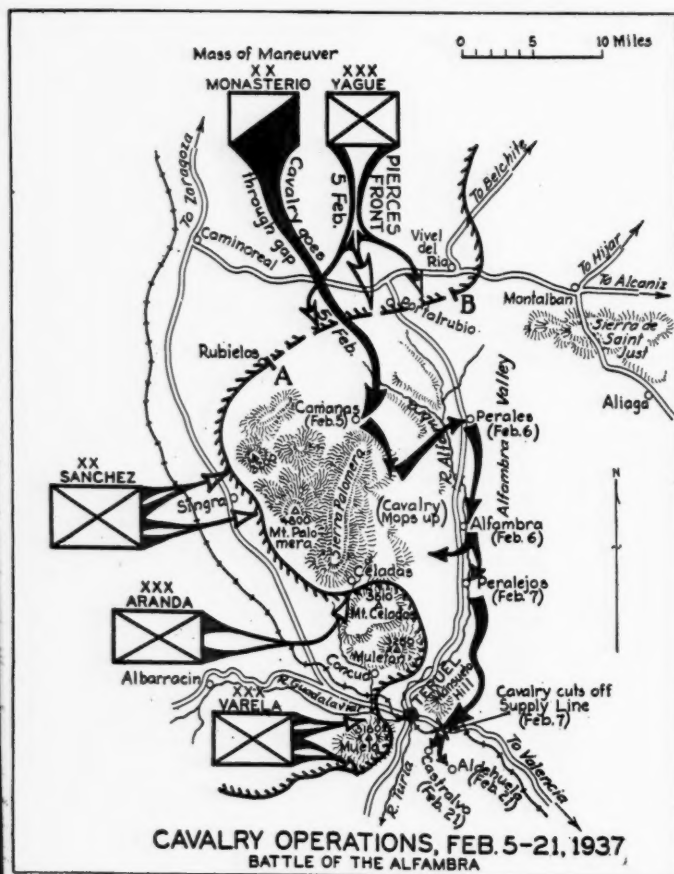
After this operation got under way, we again hear of Insurgent cavalry in more mountain fighting. It was not always successful. Mounted attacks were repulsed on several occasions. At other times, however, the mobility of the mounted units was used to good advantage to take out strong points remaining on the flanks and to get behind the enemy and cut off his retreat.

During the recent drive which netted the Insurgents Catalonia and its capitol of Barcelona, cavalry mobility was put to good use in the last two weeks of the advance on the metropolis. It drove retreating Government troops along the coast from Tortosa to Tarragona, and wiped out remaining strong points.

For fighting in mountainous areas and other terrain unsuited to automotive vehicles, and for exploitation and pursuit, horse cavalry seems to be just as useful today as it was when Forrest and Stuart made the headlines. But today the horse seldom has the opportunity to charge.

ARTILLERY

Many military observers have commented on the inadequacy of artillery support behind both Insurgent and Government infantry. During the early months of fighting the dearth of artillery was especially marked. According to General Duval in *Les Lecons de la Guerre d'Espagne*, Franco's Moroccan Army of 34,000 men had only fourteen batteries of 105-mm and 155-mm howitzers. Part of these no doubt stayed with the garrison left in Morocco. It is unlikely that General Mola's diminutive "Army of the North" had a dozen batteries during the first month or two of the war. The Government garrison of Madrid probably disposed of four or five regiments initially but many batteries fell into Insurgent hands during the rapid advance on the capital. Of the remaining units existing at the outset of war, estimated all told at 150 to 175 batteries, the bulk was scat-



tered among garrisons held by troops loyal to the government and the scant remainder in the few localities seized by rebel troops.⁽⁴⁾

Both sides soon began to receive a few guns from abroad. These, together with what they captured, improved the artillery-infantry ratio of the Insurgents, but the Government forces never seem to have had enough artillery or failed to concentrate enough at the right time and place. Presumably they abandoned guns almost as fast as they were able to manufacture and import them, this to the great advantage of the Insurgents. The expansion of the infantry components of both armies probably proceeded faster than that of their artillery components, notwithstanding the foreign personnel and matériel coming to their aid. Furthermore, from the attacker's viewpoint, the density of machine guns used in defense kept growing, and defensive systems became better organized and were extended over wider fronts, so that attacking infantry became more and more dependent upon heavy supporting fires to neutralize the hostile resistance. It was found that offensives had become more difficult and that only artillery in great volume would break down even a moderately defended front.

At first, there were few or no permanent groupings of troops into divisions and larger units. There was no organically assigned artillery. Then when infantry units began to be organized into large components, there wasn't enough artillery to make permanent allotments. Consequently, artillery was allocated where most needed. Eventually divisions and corps seem to have been provided with small permanent or semi-permanent artillery components—especially in the Insurgent Army—but the separation of active theaters of operation required that the bulk of the artillery be kept mobile so it could be sent where needed most.

The first sizeable concentration of artillery of all calibers occurred during the Insurgent offensive against Bilbao. It has been estimated that 50 to 60 batteries, ranging from 3-inch to 8-inch caliber—but mostly of 3 and 4-inch—were concentrated for this campaign.⁽⁵⁾ A battery of 12-inchers is also reported by two observers to have partaken in the siege. Moreover a battery of 65-mm (2.56-inch) howitzers was an organic part of each of Franco's brigades (regiments). Much of this matériel was German and Italian. Part was motorized, part portée, part pack. The going was rough in the mountains, many areas were defiladed to fire, and continuous close support often became difficult or impossible. This is the reason given for the Insurgents using their combat aviation to such a large extent as a reserve of artillery to support the infantry action.

Though estimates disagree, most of them indicate that somewhat less artillery was present during the subsequent rapid offensive on Santander to the west of Bilbao.⁽⁶⁾ Medium and heavy artillery failed to keep up.

⁽⁴⁾Before the war, there were, according to Duval, 9 light and 9 medium batteries in each of the 8 infantry divisions—a theoretical total of 144 batteries. There was also some mountain and some heavy artillery. From this, then, we may infer that the maximum was 175 batteries.

⁽⁵⁾General Duval (*Les Leçons de la Guerre d'Espagne*) holds that the total was about 32 batteries.

⁽⁶⁾Colonel Conrad H. Lanza, author of "Lessons from Spain" in *The Field Artillery Journal*, May-June, 1938, writes: "Two Italian divisions . . . had about 72 batteries, or 288 guns, in support, on a

In *Tree of Gernika*, G. L. Steer, British correspondent with the Basques during the northern campaign, presents a photostat copy of an Italian artillery preparation order. This calls for an hour of slow fire on six positions along a front of half a division. Following it there is an interval "for the intervention of aviation"—an interval according to the author that might vary "between one and three hours." Then the artillery executes rapid fire for fifteen minutes. Finally, says Mr. Steer, "after 4,505 shells and an enormous quantity of bombs had been dropped on the Santanderino line, the Italian divisional infantry, with its 65-mm field pieces . . . covering its advance, under a dozen of fighting planes which machine-gunned the lines ahead of it at low altitude, and screened by forty-five tanks, moved slowly forward . . ."

If reasonably accurate, the above estimate of some 50 Insurgent artillery batteries—not counting the 65-mm howitzer batteries which probably execute fires similar to those of our regimental mortars—indicates there was no mean fire support behind the 40,000 combat troops which captured Bilbao and Santander. Such a force is roughly the equivalent of two war-strength American divisions, whose artillery component aggregates twenty-four 75-mm gun batteries and twelve 155-mm howitzer batteries, or about two-thirds of what the Insurgents had. Of course if we add our corps artillery of six 155-mm gun batteries and twelve 155-mm howitzer batteries, two American divisions, reinforced, would have more firepower than that credited to the Insurgents. They didn't have the mass of artillery support seen in 1918 on the Western Front—25 to 30 batteries per kilometer—but neither were they crashing a Hindenburg Line.

To oppose this firepower the 50,000 or 60,000 troops which defended Santander had, according to G. L. Steer (*Tree of Gernika*) only fourteen batteries of 75's and one of 105's until the retreating Basques brought several 155-mm batteries from Bilbao. It would appear, therefore, that the Insurgents had a superiority of two or three to one in artillery during the northern campaign, and could also count five or six airplanes for every one of their opponents. Moreover their gun crews were far more skilled. It is little wonder that the conquest of Santander was a walk-away, especially since complete disorganization existed among its defenders.

The numerical superiority possessed by the defenders of Bilbao and Santander was far outweighed by the attackers' superiority in organization, combat skill, and leadership. Considering the attackers' all-round superiority, one should reflect that it took 80 days, counting delays introduced by bad weather and shortage of munitions, for them to reduce the stubbornly defended positions in the 30-mile segment of territory which protected Bilbao. In this connection it has been pointed out by various military critics who have seen the so-called "iron ring" designed for the final defense of Bilbao, that this fortification was a tactical abortion. It was a single fortified line, having no depth; it could readily

front of some 5 kilometers.[?] The artillery preparation lasted 75 minutes with an average expenditure of not quite 2 rounds per gun per minute . . . The infantry having reached its objective, protected itself with but minor assistance from the artillery. The latter was released for a following mission . . . in another sector, not necessarily adjacent. Utilizing long ranges, and wide traverses on carriages, the artillery, with as few changes of position as possible, drove a second wedge into the enemy's front."

Other sources indicate the total artillery present was between 30 and 50 batteries.

be seen from a distance; and it was built so close to the top of slopes that fields of fire were poor. The long delay achieved by the Basques occurred before the Nationalists reached the "ring." The ring itself was then quickly breached and the finale followed in short order.

According to the French *Revue de l'Armée de l'Air* and several corroborating sources, it was principally German staff work and matériel—aircraft in particular—which put over the Bilbao offensive, and Italian personnel and air power which engineered the Santander expedition. Taking turns it would seem.

The diversion the Government launched 5 July, 1937, on the Madrid-Escorial front, was the first planned offensive of a major character undertaken by Franco's adversary. It is estimated that 100 to 150 planes and 30 to 40 batteries, principally 75 and 155-mm calibers, supported the two corps (three?) making this attack.

Two weeks later the Insurgent counterblow was made with some 40,000 men having about the same air support, but with a reported artillery component of 65 batteries.

December 15, 1937, when the Government launched the surprise double envelopment which snipped Teruel and its environs from Insurgent territory, they had concentrated a force of at least 60,000 to 70,000 men strongly supported by artillery and aircraft. Figures vary, but one estimate of 60 batteries of 3 guns each and 125 or 150 airplanes appears reasonable. The counteroffensive, however, which the Insurgents began almost immediately and completed 21 February 1938, with the recapture of Teruel, was supported by an estimated 60 to 80 batteries and 200 aircraft.

Except for these few operations, data is too unreliable to hazard estimating the amount of artillery employed. During last summer's offensive toward Valencia, newspaper accounts from Government territory say the Insurgents were using 150 batteries to support nine Spanish and three Italian divisions. In July these twelve small divisions occupied a front of some 50 miles and aggregated in round numbers 100,000 men. That is to say the equivalent of an army corps containing three or four of our present-type divisions had an artillery component of 150 batteries. The prescribed allotment of an American corps containing a total of, say four divisions, would be 90 firing batteries. So even if this report is exaggerated 50 per cent, or 100 per cent—which isn't unlikely—the ratio of artillery to infantry was not niggardly.

Whatever the mass employed it had not succeeded in rupturing the strong Government positions north and northwest of Valencia when the diversion occurred on the Ebro.

General Armengaud, in commenting on 1936 and 1937 operations, estimated that for each Government division (of 5,000 to 10,000 infantrymen) there was approximately one battalion of 75-mm or 100-mm (105) guns. At that time there was little medium or heavy artillery in the Government army. He also remarks that the worth of the batteries varied considerably. Some were efficiently manned. The personnel of others only knew how to fire by direct observation from OP's close to the batteries.

If we accept Insurgent claims regarding captured material, the Government could not have increased their artillery strength to any degree during 1938. It is more probable that it diminished, for they have been hard put to get in foreign matériel during the past year.

There are several discrepancies in the following figures, taken respectively from a cable to the *New York Times*, 31 August 1938, quoting Count de Jordana, Insurgent vice-premier and minister of foreign affairs, and from an article by Angel B. Sanz in the Insurgent organ *Spain*, 1 October 1938. Both represent Insurgent claims of captured matériel and personnel.

MATÉRIEL CAPTURED BY INSURGENTS

MATÉRIEL	No. CAPTURED (N. Y. TIMES) (First two years of war)	No. CAPTURED (SPAIN) (To 1 August 1938)
Tanks	200	480
Artillery pieces	700	500
Mortars	—	950
Machine guns	8,000	8,000
Rifles	300,000	300,000
Cartridges	400,000,000	417,827,000
Airplanes (shot down or forced down and captured)	1,000+	1,000+
Prisoners	150,000	—

(NOTE: It is probable that some of this matériel was captured at sea and some in government arsenals.)

These figures may be reasonably accurate, or they may be considerably exaggerated. They seem within reason when considered with the successes scored by the captors.

Certainly 500 to 700 guns—125 to 175 batteries—is a heavy loss over a two-year period for a belligerent who is largely dependent upon imported matériel, and one whose initial artillery strength did not exceed 125 or 150 batteries, at most.

The most powerful offensive carried out by the Insurgents was the recent drive on Barcelona. Press correspondents said 300,000 Insurgent troops took part, 200,000 of them in combat units. A *New York Times* dispatch of 3 January 1938, from Herbert L. Mathews, who has been with the Government forces since the fall of 1936 and who must of course send out censored data, gives us these figures: "He [Franco] is said to have about 600 planes, not counting those based on Majorca; 300 to 400 tanks and at least 1,500 cannon [377 batteries at 4 guns each.]" If he did have this many, probably over a third were concentrated in Catalonia; that is, more than 125 batteries.

Despite the employment of tanks and the direct participation of combat aviation in the ground battle, it has been proved in this war that without an ample supply of efficiently handled artillery, well supplied with munitions, there is no advance. Men cannot face un-neutralized machine-gun fire, nor weak tanks oppose unsilenced antitank guns. As an Italian military commentator, Lieutenant Colonel Emilio Canevari, put it: "... Without a whirlwind of fire one does not advance an inch so long as the enemy is resolved to offer resistance." He adds further: "... Co-operation between infantry and artillery is becoming increasingly difficult to achieve . . . [This appears to be due primarily to the impossibility of OP's or air reconnaissance to follow battle movements because of the use of camouflage and cover, and the inability of definitely distinguishing friend from foe.] Actually the advance of infantry must take place as if under a bridge of continuous artillery fire, particularly of medium caliber. Quick firing artillery of small caliber is particularly useful on the defensive. On the contrary, for the attack an intensive and well-directed fire by medium and heavy artillery is indispensable."⁽⁷⁾

⁽⁷⁾ Army Ordnance, March-April, 1938.

To be capable of advancing with the infantry and continuing to give close support, artillery must have a continuous ammunition supply. Motorization, especially of trains, is therefore essential.

In the organization of our army, mortars are a weapon of infantry and not of any supporting arm. It should be pointed out here, however, that mortars, or their equivalent, have proved to be an indispensable implement of the attack. The Insurgents have used 47-mm mortars, and also German minenwerfers and Italian 65-mm howitzers—all to excellent advantage. The Government has also made use of mortars of numerous types. Both lay great stock upon the mortar's utility for giving close supporting fire against an entrenched enemy.

The massing of artillery fires, so apparent in Insurgent attacks, confirms the established principle stressed by our doctrine. Unless artillery fire is concentrated its effect is largely wasted. It has been by concentrating the combined effort of aircraft, artillery, and tanks upon one narrow sector that the Insurgents have broken the defense and permitted infantry to advance. Having done their bit in one spot, these means are then switched to another point for another effort. Hitting now here, now there, and always in force, the well-prepared Insurgent offensives create salients, outflank the intervening resistance, and then roll up the hostile lines.

TANKS

From this war military experts had hoped to get answers to the many controversial questions on how armored combat vehicles should be built and how they should be used. Their hopes have been realized only in part. Much has been learned about tank design, construction, armor, and armament. On the other hand tanks have been too defective, and they have been used on too small a scale and too inefficiently on many occasions to indicate anything new on the employment of mechanized units. From what has occurred, the validity of already established principles has been proved anew, and the fanciful visions of dreamers have been shattered.

The Spanish Army on 17 July 1936, had practically no modern tanks and only 120 obsolete or obsolescent machines, most of which were war-time Renaults.⁽⁵⁾ Crude armored cars were built on truck chassis. Three months later the Insurgents had a few small Italian and German machines, and the Government several dozen Russian vehicles. Though the small batches used initially caused little decisive effect through their mobile firepower, they produced considerable consternation and were of value as demoralizing means.

Tanks in numbers of a dozen or two, but rarely more, were used by both the attackers and defenders of the Madrid area. More often than not, they operated independently of infantry, so their effect was not exploited. Going it alone, they frequently ran into trouble with the defensive measures improvised to counter them. Many tanks were put out of action.

In March, 1937, 50 or 100 tanks were used in the misbegotten, misdirected, and mud-befouled operation near Guadalajara. In that widely publicized debacle, it is said a tank versus tank engagement occurred and was won by the

heavier and better armed (45-mm cannon and machine gun in rotating turret) Russian tanks which took on the machine-gun-armed Italian tankettes.

At Bilbao, owing to the rugged terrain, very few took part in the Insurgent attack. At least 50, and possibly 150, were used in the Santander campaign. One 50-tank battalion was seen in support of one small division. It is said several divisions had equal support.

In Pozoblanco, in the southwest and at Brunete, Belchite, and Fuentes de Ebro, the Government employed some fifty tanks or more.

After repeated experiences had demonstrated the limitations of tanks and the need for infantry and artillery support, they were used more cautiously and more efficiently. Usually they did not make their assault until artillery and aviation had neutralized a good part of the defensive fires. However, the liaison between infantry and tanks tended to be poor and control of the latter was not well planned. At Fuentes de Ebro 14 Government tanks were lost, largely because they got beyond supporting distance of infantry fires. The tanks started late, but quickly passed and outdistanced the foot elements, and then roughly one-fourth got stalled and captured in the defenders lines. Had friendly infantry been close behind, many of the losses would have been prevented.

Tanks were used in the Government attack on Teruel and during the subsequent Insurgent counterattack—probably 100 at most by each side. During Franco's drive to the sea in March and April, 1938, some 150 to 200 tanks were employed during the principal actions. Rarely was a unit of less than a battalion committed except in mopping-up activities. Along the Ebro valley the relatively flat stretches were more suited to mechanized operations than the rugged terrain prevailing in many other sectors.

Indications are that little use was made of mechanized means during the southward drive through the mountains north of Castellon and Valencia. In the fighting on the Ebro from late July to mid-November, 1938, tanks again were employed, but less extensively than in the spring. But after the drive through Catalonia got under way at the close of the year, they featured in numerous attacks.

In most all offensive operations carried out by either side during the past year or more, tanks seem to have been the third echelon of the attack. Aviation and artillery strike the first and second blows, tanks the third, infantry the fourth, and cavalry enters the action as the fifth and final echelon to pursue, outflank, or mop-up. In some instances tanks have also helped carry out this final phase of the attack. Like cavalry, their mobility, firepower, and shock action make them an excellent means for clinching complete victory by cutting off the enemy's retreat. This use conforms with our doctrine of using the most mobile elements available to push a relentless pursuit. For this use light and fast armored vehicles are especially suited.

Tanks have also proved to be excellent for counterattacks if used before the enemy has organized the newly won terrain and brought forward his antitank weapons.

It is contended by military commentators and observers of events in Spain that extremely light machines of little spanning ability, such as the German 6-ton and Italian 3-ton tanks, have shown themselves too unstable to deliver effective

⁽⁵⁾ *Les Lecons de la Guerre d'Espagne*, General Duval. *Revue Militaire Suisse*, Oct. 1937.

tive fire, and too weakly armed, too thinly armored, and too easily stymied by trenches and ditches to be used as leading tanks on breakthrough missions, or to precede the infantry assault at short distance as close-support or accompanying tanks. It is maintained that such vehicles are appropriate only for reconnaissance and pursuit. This conclusion appears sound. Light armor can be riddled by antimechanized defensive weapons. Speed has not been useable on battle-torn terrain where natural and artificial obstacles prevent rapid movement.

The consensus of numerous reports indicates that primarily two types of tanks have been used by the Insurgents, and three or four by the Government. The principal characteristics of these machines have been extracted from various sources and as shown in the accompanying table are believed to be fairly accurate figures.

GENERAL CHARACTERISTICS OF TANKS USED IN SPAIN

Type	Length (feet)	Weight (tons)	Maximum Speed (mph)	Maximum Armor (inch)	Armament	Crew	Rotating Turret	Radio
INSURGENT								
German (light).....	13	5-6	30	.60	2 MGs	2	Yes	No
Italian (Fiat-Ansaldo) (tankette).....	10	3.6	27	.51	1 or 2 MGs	2	No	No
GOVERNMENT								
T-26 (light) Russian modification of Vickers-Armstrong 6-ton A (the principal tank of Government army)	16	8-9	25	.67	1 45-mm gun and 1 MG or 2 MG	2-3	Yes	Occa- sion- ally
T-28 (Russian medium, modifi- cation of Vickers 16-ton) (Believed to have been little used)	21.6	18 or 20	20-25	1.0	1 45-mm gun and 3 MGs	5-6	Yes	Occa- sion- ally
Christie-Ruski 34 (Russian medium convertible)	19	14	40 on tracks	.67	1 45-mm gun and 1 MG dual mounted	2-3	Yes	No
Renault (French light).....	15	8	Slow	1.0	1 MG or 1 37-mm gun	2	Yes	No
Trubia (Spanish light).....	?	6-8	?	.43	3 MGs	3 (7)	Yes	No

Since the Government probably has not had at any time over 300 tanks, if that many, and the Insurgents no more than about 400, each high command has employed its machines as army or GHQ weapons. The necessary or available number have been allotted to a division or army corps as circumstances required. The battalion appears to have become the tactical unit of combat. Each Government battalion comprises three combat companies, each of which contains three platoons of five tanks—15 fighting tanks in each company, 45 in the battalion, plus command and administrative vehicles. Insurgent tank organization appears similar.

When cooperating with infantry in the attack of a position, tanks at times have deployed in two or three successive waves at intervals of roughly 50 yards and have preceded the assaulting troops by 100 to 200 yards. On several occasions the tank units followed behind the infantry until within 300 to 400 yards of the hostile positions, at which distance they moved ahead and preceded the foot elements onto the objective. In one attack, Government tanks moved out in two waves: while the first wave made its assault in front of the infantry, the second wave stopped in partial def-

ilade and covered with its fire the assault echelon and infantry.

Numerous hasty and unjustified deductions and not a few unsound conclusions about tanks have been formed by military observers in Spain and by commentators who have never seen the locale of this conflict. Declarations have been made which are entirely lacking in a solid foundation of fact. More often than not arguments have been based on one single action such as the Guadalajara affair. For example, to say that the Spanish civil war has shown tanks to be worthless, as some would have us believe, is an absurd, unsubstantiated statement which is disproved by their continued use, if nothing else. Were this statement true, they certainly would not still be employed—wasted to no purpose.

In point of fact we do not yet have enough accurate data about how tanks fitted into the scheme of maneuver, what they actually accomplished to assist infantry and the force as a whole, how many casualties they suffered, and numerous other items, to be able to arrive at final, unqualified conclusions on the utility and tactical procedure of tanks in this or a future war.

From what is known at this time, however, we can draw tentative conclusions relative to certain of the technical and tactical aspects of mechanization. Before doing this, it is only proper first to examine and have in mind the character of antitank defense which tanks have had to face.

ANTIMECHANIZED DEFENSE

Of the various passive and active measures for anti-mechanized defense employed in Spain, the antitank gun has been by far the most effective. Both armies recognize this fact. *Revue Militaire Suisse* tells us that up to the end of 1937 the Insurgents had "destroyed" 147 Government tanks by antitank and artillery fire, burned 26 (by infantry), captured 27 and repaired them.

Means other than guns, said by a writer in the Russian *Krasnaia Zvezda* to have been used with success within and along the edges of a position, are the vertical bank, the tank trap or ditch [a time and labor-consuming obstacle to construct], the field of rails, wire entanglements and mines. The vertical banks deny forward progress; the traps catch



LOYALIST TRENCH MORTAR.

Wide World Photos.

the tanks; the rails belly the tanks or force a detour; the entanglements of unrolled wire enmesh tank tracks and stall the machines; the mines break tracks that run over them. These passive measures are known to have had some effect in several tank attacks, especially in the early part of the war when tank technique was poor.

Next to the antitank gun, the most effective defensive expedient has been bottles of gasoline. Filled bottles covered with gasoline-soaked cloth are ignited and thrown at the rear armor of the tank. The bottle shatters, the flaming gasoline spreads over the tank and to its vitals, and the crew pours out—or else . . . It is said the Insurgents give a month's furlough and a reward of a thousand pesetas (\$150.00 to \$200.00) to whoever is primarily responsible for immobilizing a hostile tank.

Another expedient is contrived by tying five or six grenades around a central grenade having a handle. The pin is pulled from the central grenade so that when it is thrown at a tank track it detonates the entire bundle. In effect, this is an improvised antitank mine; real mines have not been used, so far as is known. Sometimes grenades are thrown along with bottles of gasoline.

Then there are the fabulous heroics such as that of the Government corporal, who, according to Barcelona papers, attacked some eleven tanks single-handed and forced out the occupants. *Qué hombre más invencible!*

Numerous makes of antitank guns have had proving ground tests in the Spanish laboratory and have shown their comparative effectiveness and suitability. Dr. Klotz, former German naval officer, lists the following in his book, *Lecons Militaires de la Guerre en Espagne*: Hotchkiss 13-mm and 25-mm, Oerlikon (Swiss) 20-mm, Rheinmetall (German) 37-mm, Bofors (Swedish) 40-mm. To these might be added the Italian 65-mm gun of infantry regimental artillery, the 75-mm light artillery used on both sides. These guns of course are not weapons especially designed for defense against mechanization, but on many occasions have been used for this purpose. The Russian 45-mm guns constituting the battery in each Government infantry brigade have had ample power but their rate of fire is slow.

Sizing up the special antitank guns named above, Dr. Klotz criticizes the 13-mm (caliber 0.50) Hotchkiss because its solid shot is too ineffective; the 25-mm Hotchkiss as being unnecessarily powerful (doubtful criticism); and the 37-mm Rheinmetall because of its slow rate of fire. He claims the 20-mm Oerlikon is powerful enough to penetrate one-inch armor (the maximum found on practically all light and medium tanks at present) within a range of 500 to 700 yards, and its rate of fire is practically double that of the 25-mm Hotchkiss, while its weight is but a third.

Dr. Klotz' views on particular weapons do not find universal agreement. On two points, however, there seems to be unanimity of thought: (1) Gun fire is the primary means of antimechanized defense; (2) Infantry needs an antitank gun capable of piercing at least one inch of armor within a range of 500 to 1,000 yards. This gun must be small, easy to conceal, light enough to be man-handled by a couple of men, and employ automotive traction in order to have high tactical mobility.

The idea of having two or three types of antitank weapons is favored by many—a heavy rifle or machine gun for

use with forward units in either attack or defense, and a special light cannon for echelons in rear. Oerlikon has developed a 92-pound, 20-mm, automatic rifle with a tripod, and divisible into two loads, that appears ideal for front-line defense.

No authentic data is available from which to make a definite calculation of the average attrition suffered by tank units from hostile antimechanized means.

Figures on tank losses in several actions, which presumably were based on press releases of the enemy in each case, appeared in various news dispatches and magazine articles during 1937. For example: 22 tanks immobilized or captured out of 45 engaged, 10 of 60, 14 of 84, 4 of 15, 11 of 30, 1 of 5. The average loss here is 27.6 per cent. These are probably among the worst cases. Some figures may be exaggerated. Actions of 1938 where tanks were used more efficiently are not included. They do not tell the whole story, nor give a true picture.

However, let us for the sake of comparison use this average loss of 28 per cent as the maximum probable casualties when conditions were most unfavorable and tactical and technical employment the poorest. To arrive at the percentage of machines actually immobilized by enemy action, we should reduce this figure by at least one-third, because numerous reports indicate that mechanical breakdowns, abandonment, and subsequent capture were responsible for about this fraction of the total losses. That leaves in round numbers a loss of 19 per cent directly chargeable to the defensive measures of the enemy.

Let us see how this 19 per cent compares with the score of 1917 and 1918. Lieutenant Colonel Perré in *Revue d'Infanterie*, April, June, July, 1936, has presented valuable data on World War losses. In the first French tank engagement 16 April, 1917, 80 Schneider medium tanks were immobilized out of 121 engaged. Of these 80, 28 broke down and 52 were stopped by shell fire—38 by direct, 14 by indirect fire. The result: 43 per cent knocked out by shell fire, 23 per cent by mechanical failure.

In the 10-day counteroffensive at Chateau Thierry, 585 Renaults, 190 St. Chamonds, and 185 Schneiders were engaged; 37 per cent were knocked out during the 10-day period.

From 5 April, 1918, to 2 November, 1918, enemy action accounted for 29.7 per cent of the medium and 13.2 per cent of the light tanks engaged. The average percentage of French tank casualties caused by hostile action throughout the war was 17.2 per cent.

Without considering specific causes except to mention gun fire as responsible for 80 to 90 per cent, we can see that after twenty years, losses by enemy action remain relatively unchanged—17 per cent in 1917-18, and around 19 per cent in probably the worst cases of 1937. Even though our present estimate may be in error, it leads to the conclusion that the development of tanks has been closely paralleled by the development of antitank defense.

We should not overlook the fact that neither tank nor antitank means are strongly represented in Spain. The density of antitank guns on any front in the Spanish war is insignificant when compared with that envisaged by the French, German, or Russian armies in a general European conflict. They provide for an organization in depth which

will result in having an antitank gun for every 100 to 200 yards of a division front. In Spain, the average is nearer one every 1,000 to 2,000 yards in active sectors, with few or none elsewhere: The shallow fronts in Spain are, of course, far different from the continuous lines expected in a future war in western Europe. Likewise the number of tanks engaged in Spain is but a fraction of what would be employed in a major war on the European continent.

Government brigades have had an attached battery of three Russian 45-mm guns, whose role was similar to that of the three 37-mm weapons of our howitzer company. The distribution of Hotchkiss 25-mm guns is not known, nor is data available to show how the Insurgents allotted their 20-mm guns and 37-mm guns, except that they were emplaced singly to cover likely tank approaches. During the Bilbao campaign German antitank guns were seen on the road with a German tank unit. They may have been attached to protect it from a surprise attack by the enemy's cannon-carrying tanks.

As during the World War, mechanical breakdowns have been responsible for many immobilized tanks, and this may be the principal reason why so many tanks are reported captured, still intact. Observers tell of seeing from one to half a dozen tanks abandoned by the roadside or stuck in a ditch. In this connection we should not overlook the fact that the armored fighting vehicles used in Spain do not compare technically with the efficient tanks and combat cars now found in our army. They have not the mechanical reliability, power, speed, radius of action, obstacle-crossing ability, or stability of our M-2 or T-4 tanks or M-1 combat cars. In firepower the tanks mounting a cannon as well as machine guns are better armed than our present combat vehicles.

SOME CONCLUSIONS ON TANKS AND DEFENSE AGAINST THEM

Technically, tanks and aircraft have much in common. Both are costly and difficult to replace; both are powerful threats to the enemy, bring a concentration of his defensive means, and suffer heavily as a result; both have mechanical limitations and require skilled operating and maintenance personnel in order to avoid excessive losses. Therefore both must be built as mechanically perfect, yet as simple, as technical science can make them; they must be regularly serviced and overhauled; must be handled by experts; and must be conserved for their most effective uses.

The armor on tanks used to attack in support of infantry must be impervious to easily concealed weapons of .50 caliber or less. The enemy must be compelled to use special anti-tank weapons whose size prevents ready concealment and rapid movement in forward areas. Heavy armor also is necessary to give reasonable protection when hostile tanks are met.

Tank tracks and bogies must be made less vulnerable to rifle and cannon fire. Tracks should be long enough to span at least six-foot trenches. They also require ample length and non-rigid suspension to provide a reasonably stable gun platform.

All-round fire must be possible; there must be no dead space within which the enemy can assault the machine. Either there should be enough weapons in a machine so that fire is possible in all directions simultaneously, or some guns

should be mounted in a rotating turret capable of rapid movement. The inability of Italian tanks to shift the fire of their forward guns make them easy prey to attacks from flank and rear.

To enable tanks to engage hostile armored vehicles which they may encounter, their armament must include an antitank gun.

It is doubtful whether tanks supporting infantry ever can move at a rapid rate during actual combat, except in open-warfare action before or after the battle proper. Most foreign commentators now stress armor above speed. Certainly if one or the other has to be sacrificed, speed must give way to armor.

In the tactical domain the experience in Spain has been inconclusive. Tanks have not been used in great mass and have not by themselves produced decisive results. However, the soundness of already recognized principles of tank employment has not been disproved. Tanks must be conserved for vital and decisive missions and be employed only on terrain suited to their capabilities. Detailed reconnaissance must precede their action. Only limited objectives can be assigned if control and coordination are to be maintained and excessive losses prevented. Strong supporting fires are imperative: artillery, aviation, and infantry. Smoke may often be advantageous. Notice how tanks have followed the preparation of aircraft and artillery. The better organized the enemy position, the more necessary is this fire support.

Tank units should not be used to occupy terrain which they have overrun. Attempting to occupy terrain deprives them of their mobility and a chance to prepare for future action, and increases their susceptibility to hostile action. For this reason, and to gain the maximum return from the tank effort, troops armed with machine guns and antitank weapons must follow the tanks closely to occupy and defend the ground won. When used for mobile operations such as pursuit, the accompanying troops should be motorized.

Liaison with infantry and supporting arms is a problem which requires careful planning; otherwise it will fall down and the operation will be a failure, as often has been the case in Spain.

Technical surprise can no longer be counted upon as during the infancy of tanks. This fact, together with losses to be expected from improved defensive measures, demand more than ever that tanks be employed in mass. The degree of mass varies, of course, with the situation. In an action by an independent division with its normal organic means, a battalion may be ample; on a continuous front strongly organized in considerable depth, a brigade may be too little. We should not forget that the greater the mass, the more profound the enemy demoralization. Defenders take heart when they see one or two tanks drop out of a platoon of five, but a proportionate loss in an avalanche of dozens goes unobserved; fear seizes the bravest.

Were the tanks used in Spain more mechanically efficient, less sensitive to terrain, better armed, armored, and manned, and were they always used in accordance with recognized principles, it is probable that the critics of mechanization would have little foundation for deprecating the value of armored combat vehicles. One should not lose sight of the technical reasons for excessive losses nor forget that too few

tanks have been available in most instances to produce expected results.

Tanks have not become impotent through the capabilities of defensive means against them. But it should be realized that tanks now have to fight on an equal basis with antitank defense. Obstacles, traps, mines, antitank guns, and the enemy's own armored fighting vehicles, these are to tanks what trenches, barbed wire, artillery and machine-gun fire are to foot or mounted troops.

Tanks are not invulnerable land battleships capable, at any and all times, of clearing the way for infantry; they are merely one of the many mechanical aids, one of the supporting weapons, available in combination with other arms for a commander to use in furthering the accomplishment of either an offensive or defensive mission. Therefore, to achieve success, tanks must be used with other arms and according to the principles that govern other arms. They must be concentrated secretly and their attack delivered quickly and in force, so that it comes as a surprise before an effective defense can be built up against it at the point chosen for the blow.

MOTOR TRANSPORT

Motor transport has been extensively used by both parties in the war. The Insurgents requisitioned all types of vehicles for their northward march from Seville on Badajoz and Madrid, and improvised a few armored cars to furnish advance guard security. Owing to the resistance encountered en route, the actual rate of advance was comparatively slow, averaging only three to four miles a day. Trucks were used by the mobile columns which converged on Malaga and captured it 8 February, 1937.

The Government also used motors to transport troops from Madrid to meet the advancing Insurgent forces, and later to reinforce the garrison of Malaga. Initially the wastage of automotive means by Government militiamen was disgraceful. When a car broke down or failed to start it was abandoned. In 1937, however, the Government organized a system of auto parks, motor battalions, and repair depots. Artillery and tanks, as well as troops, were carried in trucks whenever long moves were required.

The Insurgent motor system attained an equal or higher degree of organization. It took the Guadalajara defeat, however, to impress upon high commands that motorized columns are extremely vulnerable in the fighting zone; become excellent targets for artillery, aircraft and tanks; and must be protected by special security measures at all times. Night movement became customary and proved the best protection against air attack.

Motors aided the Government to secretly concentrate the force which attacked Brunete, and motors also enabled the Insurgents to rush reinforcements which stopped the penetration and ultimately counterattacked.

So on throughout the war motor vehicles have permitted rapid troop movement from one front to another, for launching surprise attacks, for reinforcing critical sectors, for pushing pursuing detachments after a retreating enemy. For example, according to General Niessel, in *Revue Militaire Générale*, December, 1938, a force of four battalions, two light artillery battalions, one heavy battery, one antiaircraft battery and antitank guns, was moved at night by motor from

Gandesa over a 20-mile stretch of mountain roads to reinforce General Valino at Tortosa (April, 1938). General Yague's Moroccan corps made extensive use of trucks for troop transport during the eastward offensive through Aragon in March and April, 1938.

A large part of the supply trains of both armies have been motorized, with resulting simplification of the rear-area service. The biggest supply job which automotive vehicles have done in this war is to feed Madrid. Rail communications cut, the 800,000 inhabitants have been dependent for two years upon truck transport to bring supplies from the nearest railhead in government hands—ninety miles away.

Not everywhere could motor transport be used. Campaigns in the mountains had to depend upon pack animals and the ancient Spanish mule carts for carrying much of the necessary supplies, matériel, and munitions.

Wars are fought over varied terrain. Roads may be plentiful and good, or few and poor. Therefore an army dare not have everything motorized, but should adapt its transport to the conditions of its probable theaters of operation. We are fortunate in having an excellent road net in our continental territory and may therefore motorize extensively.

AIRCRAFT

Aircraft has played a part of primary importance in the Spanish civil war. Of all the supporting arms no other has been followed so closely. This is not to be wondered at since it is the only conflict since the World War—save the Sino-Japanese affair, perhaps—wherein both belligerents have used aircraft on a comparatively large scale. Indications are that in 1937 the Insurgent air force averaged 400 to 500 planes and the Government air force 300 to 400; while in 1938 the Insurgents maintained over 600 planes and the Government probably no more than in 1937, if as many. These are not large forces, of course, if compared with World War figures or with the armadas envisaged in a general European holocaust of the future, yet they are far from insignificant.

Like tanks, airplanes have not lived up to all expectations of their over-ardent partisans. Just as has been proved throughout the ages, no new weapon, however powerful, can dominate the battlefield and assure immediate success. While the Douhet theory has not been put to a real test in Spain—partly for lack of sufficient aircraft and munitions, partly for political and sentimental reasons—events so far have not shown it possible to win a war entirely in the air. Rather, one must conclude that the decision still rests on the ground, and that aviation merely fills the role of a powerful auxiliary arm to assist in gaining that decision.

When General Franco flew from the Canary Islands to lead the Insurgent forces in Morocco, Spain's combined land and naval forces contained some 300 obsolescent planes—of which less than 200 were serviceable for military purposes.⁽⁹⁾ Over three-fourths of these were at bases retained under government control. Fortunately for the outnumbered rebels, Italy and Germany quickly came to their aid and gave them at least qualitative superiority during the advance on Madrid. Both parties lost heavily in planes and

⁽⁹⁾Les Lecons de la Guerre d'Espagne, Duval; Spain; If War Comes; Army Quarterly, Jan., 1938.

air personnel during the early months of fighting. Then Russian planes of higher speed than the German and Italian craft began to arrive, and, for a brief period, put the Government air force on top. This would not do, so Franco's allies introduced more and better equipment and reversed the scales again. Throughout 1937 and 1938, it appears that the Insurgent air force enjoyed superiority in numbers, though not always in quality. During the Catalan offensive Insurgent planes outnumbered Government planes by three or four to one, perhaps more.

Numerical superiority in the air is, of course, like numerical superiority in a ground arm, largely a matter of time and place. Weather conditions and the number, size, facilities, and proximity of fields also govern. Often the Government by concentrating its forces has gained momentary advantage, as, for example, at Guadalajara, Brunete, and Teruel. Often, too, weather has favored one side or the other.

We have noted the absolute air superiority possessed by the Insurgents throughout the six-month campaign on the north coast—the conquest of Bilbao, Santander and Gijon. Two factors contributed most to this circumstance. The Basque and Asturian provinces were separated from the central and eastern Government air bases by 200 to 300 miles of territory under Insurgent surveillance. This was a long hop for pursuit planes whose fuel capacity and radius of action are small. Should they make the hop and then, through bad weather conditions or hostile action, be unable to land, they would be without enough fuel to get back. To send bombers—which could ill be spared at the time—without an escort of pursuit, was taking long chances with hostile capabilities to intercept and destroy them. As a result, it was not until Santander was threatened that Government bombers were sent to harass the enemy. The second factor contributing to Insurgent freedom of air action during the northern campaign was the smallness and limited number of airdromes in the mountainous provinces. These the Insurgents squadrons were able to keep under almost constant surveillance, and make it difficult for the few Government planes present either to take off or land. On the other hand there were ample Insurgent airdromes at Vitoria, Burgos, Soria, and Logroño—close to the fighting zone—from which Franco's aircraft could readily make up to three flights a day on Bilbao, and also intercept hostile reinforcements from Madrid or Barcelona fields.

One thing gave the Basques occasional relief from air attacks and kept Insurgent squadrons from having complete freedom of action. That was the soup which frequent fog and rain made of the otherwise blue skies over the Cantabrian Mountains.

In our service we are accustomed to think of four types of military aircraft: observation, attack, bombardment, and pursuit. In Spain only bombardment and pursuit planes have been employed, but these two types have also done the jobs of attack and observation aviation. However, there being too few machines on hand to carry out all the missions theoretically expected of a complete air force, the airplanes available have had to be put on the most pressing tasks, regardless of suitability. Among these, air attack by both bombers and pursuits to assist in the ground battle seems to

have had high priority, whereas air service tasks of reconnaissance and observation have been slighted.

Opposing air forces also have been used for raids on rear-area targets within the combat and communications zone; such as, lines of communication, supply establishments, truck and troop columns, and aircraft on the ground. Finally each air force has within its capabilities, carried out bombing raids on strategic objectives, behind the theater of operations. Government aircraft, owing to the location of their bases and inferior numbers, could do little. But the Insurgent squadrons attacking Government industrial centers and shipping along the Mediterranean coast have flown from the air base on Majorca Island, with no hostile airdromes en route to worry them. They could employ the "silent approach," coasting in quietly from high altitude to drop their eggs and then scurry home. Insurgent mastery of the sea also helped keep these raiders undetected until close to their objectives. Pursuit escorts were unnecessary.

AIR SERVICE

In this war, battle reconnaissance missions have been difficult to execute, except when the enemy air force was neutralized, and therefore have been infrequent. Similarly, reconnaissance of the theater of operations for information of the enemy has been a hazardous undertaking for single planes, and, accordingly, a mission that has been ordered only when absolutely necessary.

It is claimed that observation missions for controlling artillery fire are unnecessary in Spain because of the dominant terrain features that are always present to serve as OP's. Furthermore, little of the artillery being of medium or heavy caliber, long-range adjustment seldom is required. Moreover, radios are not installed on Insurgent or Government pursuit planes, hence adjustment of fire by air observation would be a slow, difficult procedure.

During the conquest of the northwest coast Insurgent air supremacy made reconnaissance and battle missions easy to perform, but in the eastern theater both air forces for a long time were nearer parity and flew with caution. During the Catalan offensive the Insurgents had a decided superiority and used aerial reconnaissance whenever weather permitted. Without air advantage or superiority, air reconnaissance was a problem.

COMBAT AVIATION

In Spain, bombing and pursuit aircraft have been used in lieu of attack planes for all combat missions. Results, in general, have been mediocre as to material damage done upon fixed military objectives, but upon troop columns and concentrations they have been highly profitable. One of the earliest attacks on troops occurred when Insurgent planes bombed and machine-gunned the Government force that made a landing on Majorca Island. There, as at Guadalajara, it was primarily air action which routed the adversary.

Aircraft have also been used as a "fifth arm," as General Armengaud terms it, to participate directly in the ground battle. That is, they have supplemented the action of infantry, artillery, tanks, and cavalry, by making direct attacks on deployed personnel.

In view of the conditions of terrain, the limited matériel in Spain, and the matériel which could be provided by the

outside forces involved, it does not seem improbable that these forces either snatched the opportunity to use Spain as a laboratory for testing combat aviation as a fifth arm in the ground battle—that is, as a reserve of artillery—or were obliged to do it from necessity. It is contended by some that shortage of artillery was the cause, and inequality of air forces the reason for continuance of this procedure. Whether through design or necessity, this use of aircraft has been almost an habitual role, and the desired effect seems to have been achieved.

In effect, we see low flying bombers and still lower flights of pursuit planes (some of which have bomb racks) completing the artillery preparation, and often rendering close support during the infantry attack as well. When tanks are present they, too, benefit by the aircraft participation. The most opportune use of combat aviation is in counterattacks. Invariably, whenever a surprise attack is made, this arm has been the defender's quickest, most effective means for stopping the enemy. It strikes the first counter blows.

Observers seem to agree that it was primarily aviation which blasted out the intrenched defenders of Bilbao. Whenever weather permitted, the Insurgents were in the air. Sixty-three bombers attacked Mt. Lemona; 40 to 50 bombed one part of the iron ring 11 June.⁽¹⁰⁾ Bombs of 50, 100, and 200 kilograms were used on this front; also small 2 kilogram incendiary bombs which set fire to areas behind the lines.⁽¹¹⁾ General Armengaud, writing in *Revue Militaire Générale*, March, 1938, quotes a Government colonel as follows: "... No enemy attack of any importance could have succeeded with the artillery preparation alone. ... It had to lift as soon as the infantry was within 300 yards of our trenches—too soon to prevent the hostile infantry from being destroyed by our automatic arms if it tried to assault with only its own means. It was the aviation primarily which prepared the attack. It produced enormous moral and material effects. ... The bombers usually operated by groups of twelve ... [flying oftentimes at 1,000 to 1,500 feet]. These were relieved by a similar group—and thus it went throughout the whole day. ... In addition, pursuit planes and light bombers ... came over to machine-gun and destroy with explosives or set fire to all targets which appeared on the routes of communication to the front, and likewise bombard munitions depots and people in the towns and cities in the rear. After several days of violent bombardments, the occupants of our front lines being almost buried, killed, or worn out and immobilized, the hostile infantry took possession of the ground."

Similar declarations were made by participants in the battle of Teruel and other engagements. The Insurgent successes certainly cannot be credited entirely to their aerial attacks, but the very fact these attacks always are a part of the battle preparation and often of the assault and pursuit indicates that they have proved worth while.

The French aviation reserve Captain Poulain says that he was amazed at the sparsity of guns in the vital sector when he saw the plan of operations against Santander. "It

doesn't matter," he was told, "at the right moment we shall have all our aircraft concentrated for the bombardment." He comments that "infantry stands up badly to bombs in Spain—particularly to the bomb of 50 kilos (110 lbs.), which is the standard projectile used both by the Insurgents and the Government forces."⁽¹²⁾

An ideal target for air attack is a closed-up column of trucks. Even separated vehicles on a fairly straight road are liable to be knocked out. It has been a common occurrence. The Insurgent "ace of the camions" told Captain Poulain, that in a well-organized attack on a convoy, one truck out of three should be set on fire; the others held up, their drivers killed or wounded, and their engines ruined: this, without counting those overturned in ditches, and the inevitable traffic jams. This may be over-enthusiastic but the picture is not bright for truck columns. Look at what happened near Guadalajara. Seventy-three Government planes (33 bombers and 40 pursuit) were in the air at one time.⁽¹³⁾ They had an airman's field day—several of them, in fact.

Troop and supply truck movements by night should have been the solution in Spain, for there have been few air attacks during darkness, excepting bombing raids on factories and the like.

There are difficulties for planes participating in a ground battle. One is to distinguish between friends and enemies. Both air forces have been guilty of shooting up their own people. Oloff de Wet, in his "The Patrol is Ended," recounts how his Government squadron wiped out a position, unopposed by hostile craft, only to find out later they had killed and wounded 364 of their own men. Insurgent bombers killed 116 of their own infantry at Fruniz near Bilbao.⁽¹⁴⁾ Thereafter white markers pointing toward the enemy were used to indicate friendly assault lines.⁽¹⁵⁾ White markers in triangular form are also said to have been put on the backs of infantrymen, the apex up, so that planes flying overhead would have prone pointers showing generally where the hostile resistance was located.⁽¹⁵⁾

A look-out must be kept for hostile planes. Fast-flying attack or pursuit planes can, however, hedge-hop and keep pretty well out of sight, and if spotted by enemy chasers, make attack difficult by flying low. Fire from the ground is to be feared but small arms have downed very few planes.

In *L'Aviation Belge*, 16 April, 1938, Charles Sweeney who accompanied General Armengaud to Government Spain, relates how attacks were made on Insurgent lines in 1937. "Hill scraping" from their fields, the planes [120 mph Natcha (modified Brequet 19's)] follow roundabout roads in order to land when threatened by hostile chasers. Arriving at the hostile front lines in groups of fifteen to fifty, they make short but violent raids on the hostile position, never flying higher than 300 feet and often under 150, passing in a circle over the enemy without letting up on strafing or bombing. Government officers said they formerly flew at 1,000 feet, but at that altitude, the hostile infantry machine-

⁽¹²⁾ "The Role of Aircraft in the Spanish War," *Journal of the Royal United Service Institution*, August, 1938.

⁽¹³⁾ *Two Wars and More to Come*, Herbert L. Mathews.

⁽¹⁴⁾ *Tree of Gernika*, G. L. Steer.

⁽¹⁵⁾ Statements of deserters given in *Tree of Gernika*, G. L. Steer.

⁽¹⁰⁾ *Bulletin Belge des Sciences Militaires*, Dec. 1937.
⁽¹¹⁾ *Tree of Gernika*, G. L. Steer; *Revue de l'Armée de l'Air*, Oct. 1938.

gunned them heavily, whereas at 150 feet the enemy became panic stricken and only sought concealment.⁽¹⁶⁾

Besides their tactical and strategical support, aircraft have also furnished direct assistance to ground troops by transporting personnel and supplies. Several thousand Insurgent troops (probably between 5,000 and 10,000) were flown by tri-motor planes from Morocco in August, 1936, when the Government navy controlled the Straits. Planes have carried and dropped food to several beleaguered Insurgent garrisons.

A survey of the varied service performed by aviation in the Spanish Civil War, shows that the air force is a powerful supporting arm of all-around utility; that it is required in large numbers with a well-balanced proportion of all the different types of planes; that attrition is enormous; that aircraft is definitely limited in action, unless superior in time and place, to the hostile air force. When artillery and tanks cannot give infantry enough support, combat aviation may have to intervene directly in the zone of action of these two arms to supplement their fire and shock action. Aircraft are the means which a commander may employ to influence in the shortest possible time the morale of both friendly and enemy ground troops. They are his fastest, most effective reserve for intervening to limit hostile action.

ANTIAIRCRAFT DEFENSE

The war in Spain has proved that the "fighter" or pursuit plane is one of the most effective weapons for bringing down enemy planes. This war has also taught military fliers the world over a new respect for antiaircraft artillery, which is no longer the hit-and-miss weapon ridiculed by aviators during the early days of the World War, but a powerful antidote to the air attack.

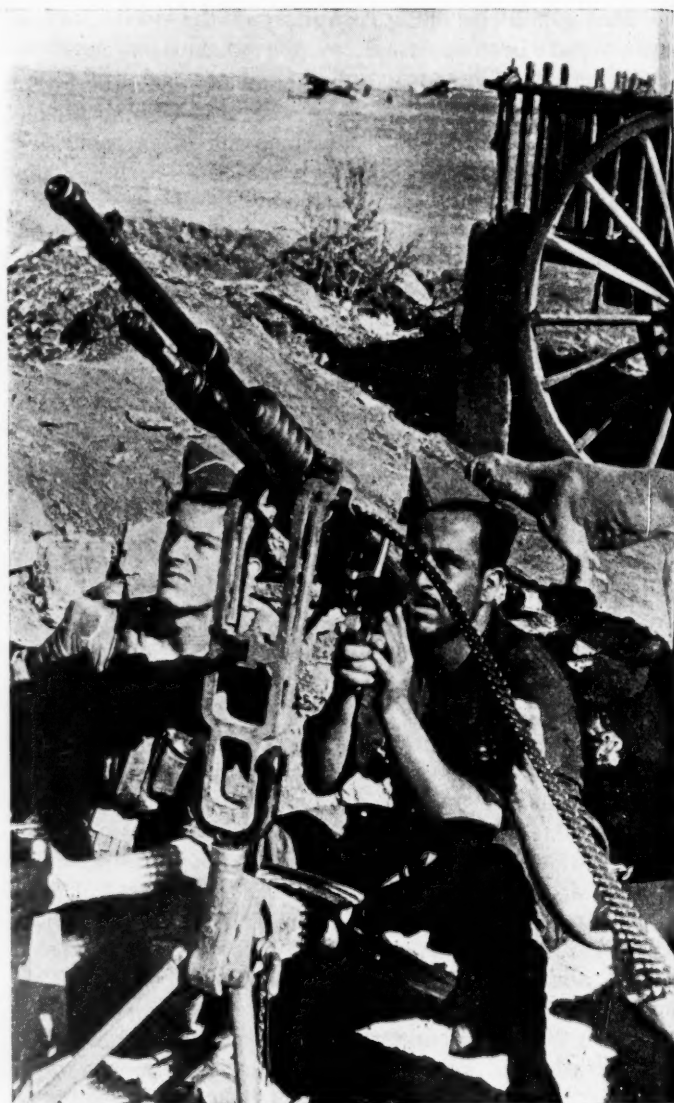
Pursuit aviation has accounted roughly for three-fourths of the enemy aircraft shot down, antiaircraft artillery for about one fifth, and small arms for the remaining fraction. However, it must be borne in mind that the effectiveness of antiaircraft artillery is measured by the degree to which it prevents or defeats hostile aerial activity directed at ground elements rather than by its destruction of aircraft.

The best antiaircraft guns used in this war are the Krupp weapons—on the Insurgent side—sent in with German crews and observers to watch them in action. The 88-mm has been very effective against high flying craft, while the German 37-mm used by the Insurgents and the Swiss 20-mm Oerlikon used by the Government forces, have been highly effective against low flying planes. Based upon operations conducted during the first year of the war, General Armengaud wrote in *Revue des Deux Mondes*, 15 August 1937: "The small automatic guns make the sky practically untenable up to a medium altitude, within the limit of their range of action." Early in the war, losses due to antiaircraft fire were placed as high as eighty per cent. This has been attributed to the fact that at the beginning, planes were slower, flown at low altitudes and with little regard for ground weapons. General Niessel, in *La France Militaire*, 6 May 1938, now places losses due to antiaircraft artillery and machine guns as eighteen per cent.

⁽¹⁶⁾ Other declarations are the reverse: that flights over hostile troops have had to go up from 150 to around 1,000 or 1,500 feet to be safe from ground fire.

Light machine gun and rifle fire does comparatively little damage to an enemy plane, unless the shot happens to strike a vital part of the craft, or the pilot himself, and in most modern planes pilots have armor protection.

Passive means of defense, such as dispersion, concealment, camouflage and cover have proved to be highly efficient.



ANTIAIRCRAFT MACHINE GUN

Wide World Photos.

CONCLUSIONS

The Spanish civil war has shown that no one arm by itself can dominate the battlefield. Infantry remains the decisive arm, but it can no longer win a battle with its own means as was often done prior to the World War. Today infantry is helpless in offensive combat and incapable of long resistance in defensive combat, unless strongly supported by auxiliary arms.

None of these has lost its importance. More probably they have gained. Modern weapons for defense make the attack of an entrenched position a task which requires the overwhelming support of neutralizing means that can put fire down into the defenders' holes—artillery, mortars, air-

craft, tanks. In modern combat infantry's flat-trajectory weapons are defensive and not offensive tools.

The tactical offensive is today a most difficult operation and should not be undertaken without great superiority in combat means. Conversely, the defensive—by virtue of field fortifications and modern weapons to delay, aerial observation to limit surprise, and combat aviation, tanks and motorized reserves of infantry and artillery to counterattack—is a less difficult operation than in the past. A defender can hold off an attacker much superior in men and matériel. Should a successful attack be made, it can quickly be stalled, given adequate air and mechanized means to deliver a counterattack.

The power, the speed, and the flexibility of the modern implements of all supporting arms and services, have made warfare more complex. The commanders and staffs of large units will have far more problems to solve in the future than ever faced military men in the past. This is a proven fact from experiences of the war in Spain. That war has been successfully waged throughout by an army which has not always had superiority in matériel, has usually been inferior in numbers, but has from the very beginning had capable officers to plan, direct, coordinate and control the employment of its various elements. We have seen this army consistently winning and the one without such officers consistently losing. Think that over.

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MILITARY NEWS

around the

WORLD



BY
MAJOR E. M. BENITEZ, C.A.C.

ARGENTINA

On 11 January the Senate approved purchase from its British owners of the famous Trans-Andine railroad connecting Argentina and Chile. The Chamber of Deputies already had approved the purchase, at 5,614,000 pesos (about \$1,680,000). Service on the Trans-Andine was disrupted by a flood in 1934, but the bill provides for reconstruction of tracks.

BELGIUM

According to reports, a national subscription fund sponsored by the "Comrades of the Great War" Association has been opened with the object of presenting to the military air service nine aircraft, one from each of the nine provinces of Belgium, to form a squadron to supplement existing air defense.

(*Royal Air Force Quarterly*, January 1939)

BOLIVIA

On 28 October 1938, two days before the closing of the National Convention of Bolivia, that body adopted a new constitution, which was promulgated by President Germán Busch on 30 October, and at its final session he and the Vice-President gave their oaths of allegiance to the document.

In regard to nationality, the new constitution provides for loss of citizenship for two reasons: Joining enemy forces in time of war, or fighting in a foreign war without permission of the government.

The army is discussed in Section XX. Its size is to be fixed at each session of Congress. All Bolivians must perform military service, in accordance with the law, and while the army is charged with the maintenance of order at home and security abroad, it shall also cooperate in the construction of highways and other means of communication and in colonization. It is now directly subordinated to the President.

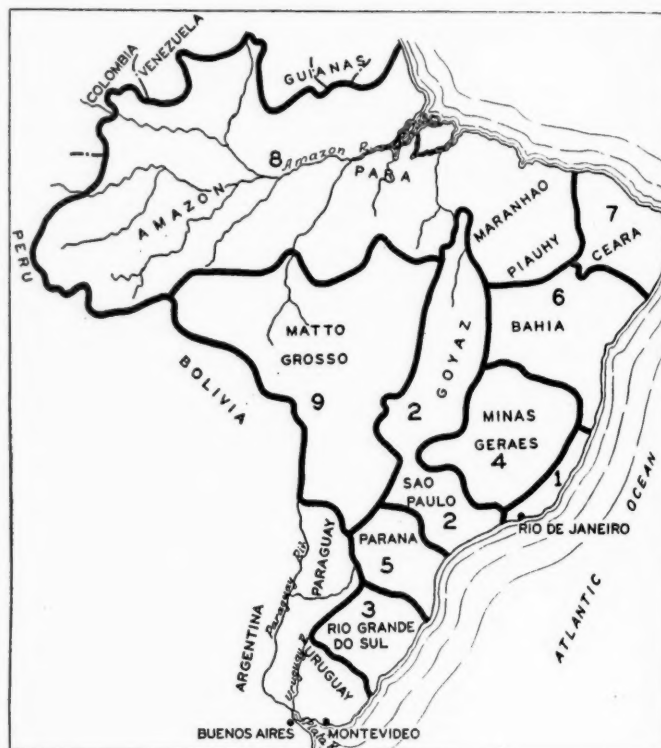
(*Bulletin of the Pan American Union*, February 1939)

BRAZIL

Brazil is divided into nine military regions. It has the largest army in South America, consisting of 6,608 officers and 76,562 enlisted men. In addition, there is a police force, trained and organized as an army unit which added to the

strength of the regular army, gives Brazil a total force of 8,633 officers and 112,950 men.

There are several service schools. There is a French military mission of several officers headed by General Noel,



MILITARY REGIONS OF BRAZIL

who succeeded General Gamelin, now Chief of Staff of the French Army. In addition, Brazil sends each year a number of officers as students to service schools in other countries.

(*Revista Militar*, Argentina, September 1938)

CHILE

The Chilean Army consists of four infantry divisions and one cavalry division. The infantry division consists of three infantry regiments, mountain troops (1 Andine regiment and one group of mountain artillery), one artillery regiment and auxiliary troops.

The cavalry division consists of four brigades, each of two or more regiments.

The air forces are organized into two brigades (each of three groups), one bombardment group and one antiaircraft defense group.

(*Rassegna di Cultura Militare*, June 1938)

CHINA

Despite the struggle of Chinese Nationalist forces against the Japanese invaders, the Chinese government is adopting effective measures for development of industry, and for the strengthening of economic bases in Southwestern China, especially in Szechwan province. Steps are being taken by the government to improve agriculture through perfection of the irrigation system. Repairs to the irrigation facilities in the Szechwan region which includes 16 counties of the Chengtu valley, will increase next year's agricultural production by one-third.

Nine of the largest of Chinese textile factories, formerly located in the Shanghai and other districts, have been transferred to Szechwan, and two of these factories are now in operation. Also transferred to Szechwan were over 300 concerns from every branch of industry. Many of these are already operating in their new locations.

The area under cultivation for cotton is being greatly increased, providing raw material for 200,000 spindles.

A special geological office was established last year to supervise the exploitation of hitherto untapped natural resources of Szechwan. Coal deposits alone have been estimated at 10,000,000 tons. Chungking is fast becoming the center of the new coal industry.

Large oil deposits have been discovered west of Chungking. Iron and copper have been found in large quantities in several counties.

Thousands of refugees have been placed at work in the gold mines, at several points in western Szechwan.

Production of rock salt is being increased.

Further development of industries in Western China is being anticipated with the opening of new routes of communication with foreign markets. These routes are now in the process of building.

(Krasnaya Zvezda, 17 January 1939)

COLOMBIA

The country is divided into six zones and each zone into military districts, the number of which is fixed by the Ministry of War. Each zone supplies the contingent required for the replacement of army effectives.

(Armaments Year-Book)

COSTA RICA

The Department of Military Police and the Corps of Investigation Officers are part of the Department of Public Security. There are, in addition to this force, a Provincial Police Force, a Customs Guard, a Revenue Guard and a Prison Guard.

The Provincial Police comes under the Department of Public Security; the Customs and Revenue Guards under the Department of Finance and Trade.

(Armaments Year-Book)

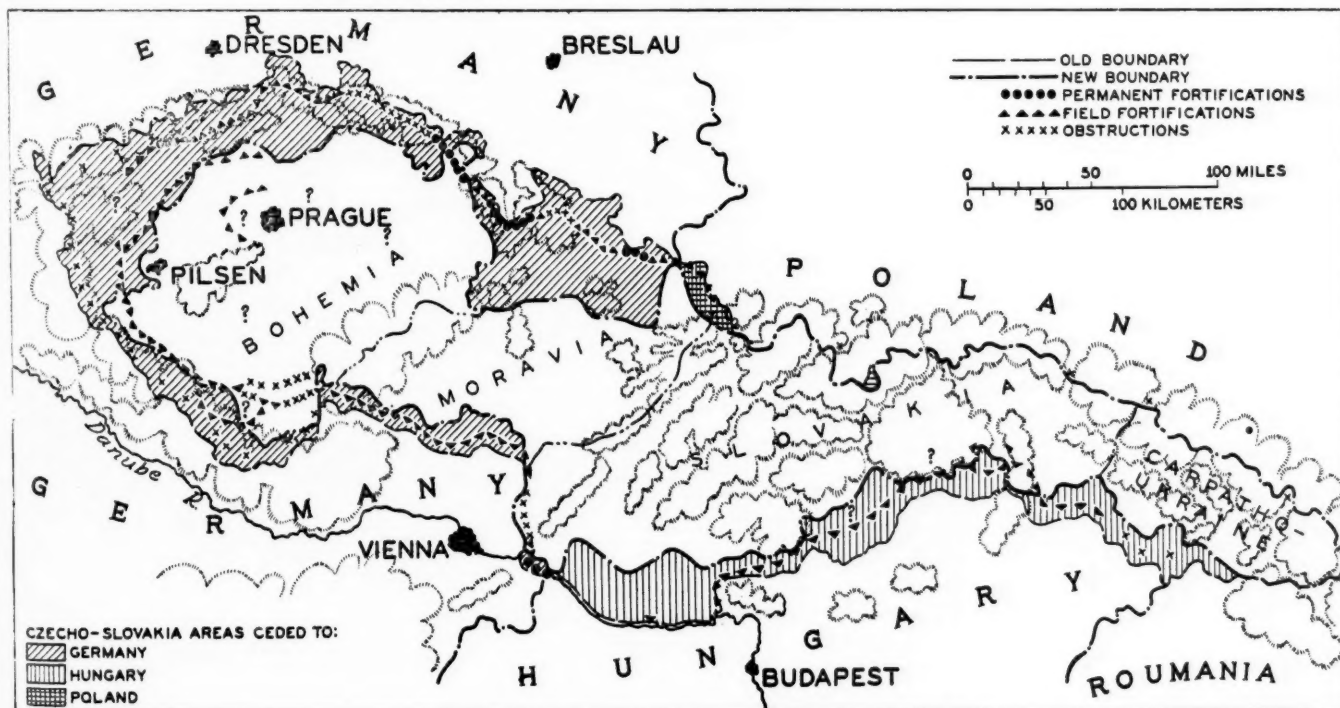
CUBA

By a decree of 11 October 1938, one million pesos were appropriated to begin, continue and conclude public works throughout the island. Over a third of this sum will be spent on highway and street works.

(Bulletin of the Pan American Union, February 1939)

CZECHOSLOVAKIA

The area of Czechoslovakia before the Munich Pact was 140,490 square kilometers with a population of 14,729,500. The present Czechoslovakia has an area of 99,701 square kilometers with a population of 9,800,400. The areas ceded to Germany, Hungary and Poland are shown on the map.



CZECHOSLOVAKIA BEFORE AND AFTER THE MUNICH PACT
Note the fortifications

Economically the nation has been disrupted. A Czech statistician, estimates that of the mining permits issued in 1930, 49% have been left to the Republic with 64% of the workers; the nation has lost almost all its production of lignite, the present output being only 2 tons as compared to 16 tons, which was the former production. Other industries are under similar conditions. It is believed that only through closer relations with Germany can Czechoslovakia possibly restore her national equilibrium.

(*L'Illustration*, 10 December 1938)

DENMARK

There is a gun factory in Denmark which is among the most efficient and best equipped in Europe and one whose products have been adopted by some 25 countries in various parts of the world.

The Dansk Industri Syndikat, Compagnie Madsen A/S, which is in the Free Port of Copenhagen, was founded in 1900 and officially has a working capitol of \$1,000,000. From its inception, the factory has specialized in the manufacture of various types of Madsen machine guns, originally, the invention of the Danish General Madsen. Manufacturers in other countries—notably Norway, Argentina and China—are making Madsen guns under license. The Madsen machine gun has no visible muzzle flash and is almost invisible either to terrestrial or aerial observers.

(*United Services Review*, 5 January 1939)

ECUADOR

A new Pan American-Grace Airways plane service inaugurated 19 November 1938, now links, by air, Quito the capital of Ecuador, with all other American capitals.

The location of Quito in an Andine valley, 9,500 feet above sea level, made it difficult to establish air connections between that city and other regions. It was the last South American capital to be connected with the continental air routes.

(*Bulletin of the Pan American Union*, February 1939)

FINLAND

The Aland Archipelago between Sweden and Finland, called the "Baltic Malta" because of its strategic position, was demilitarized by international convention in 1856, which was renewed in 1921. The Finnish and Swedish governments have agreed on limited remilitarization, with conscription for the islanders,—about 30,000—who have home rule under Finnish sovereignty. Strategically, the islands are the key to Swedish iron deposits, and an enemy installed in the Alands could bottle up the Soviet fleet in the Baltic.

FRANCE

Superior War Council:

Beginning January 1, 1939, the council will be composed of the following members: Rear Admiral Jean Darlan,

Chief of Staff of the Navy, president; General Gamelin, Chief of Staff of National Defense, vice president; other members: the Marshals of France—Pétain and Franchet d'Esperey; Major Generals: Georges; Billot, Military Governor of Paris; Prételat; Herring, Military Governor of Strassburg; Doosse; Noguès, Commander-in-Chief of the forces of Morocco; Colson, Chief of Staff of the Army; Condé, Inspector General of Artillery; Besson, Inspector of the Alpine troops; Blanchard, Commandant of the Center of Higher Studies and Inspector General of military schools; Garchery, Inspector General of Infantry; Buhrer, Inspector General of Colonial troops and Chief of Staff of the colonies; Huntziger and Requin.

(*La France Militaire*, 4 January 1939)

The "Richelieu," France's first 35,000-ton battleship was launched at Brest, 17 January 1939. It is now planned to launch the keel for another 35,000-ton battleship, the "Georges Clemenceau."

The principal characteristics of the "Richelieu" are: length, 794 feet; width, 103 feet; speed, 31.5 knots per hour; armament: 8-380 mm (15.2 in) guns and 15-152 mm (6 in) guns; number catapults, 2; number of airplanes, 4.

(*La France Militaire*, 21 January 1939)

Tanks:

The new French D tank is a medium tank of 13-15 tons weight, 20-mm thickness armor protection, and armed with a 47-mm gun and two machine guns. It has a radius of action of 50 miles, a maximum speed of 12 m.p.h. and average speeds of 5 m.p.h. in action and from 2 to 3 m.p.h. on a rough country. It carries a short-wave wireless set with a range of from 2 to 4 miles.

The role foreseen for the "D" tank is to accompany infantry in attack and to deal with hostile automatic weap-



THE ALAND IS.—STRATEGICALLY LOCATED IN THE BALTIC SEA

ons. They are divisional weapons and a company of them will normally attack on a front of from 600—800 yards; i.e., on an infantry battalion front, though for secondary or holding attacks the front may be double the above, corresponding to that of a regiment. Normal intervals between tanks should not be less than 50 yards.

(Bulletin Belge des Sciences Militaires)

Airplane:

A new Hispano-Suiza airplane engine has been exhibited recently in Paris. It is a 24-cylinder 2,000-horsepower, H-type motor with a gear-driven supercharger, and arranged to drive two coaxial propellers in opposite directions, or a single large propeller.

(La France Militaire, 1 December 1938)

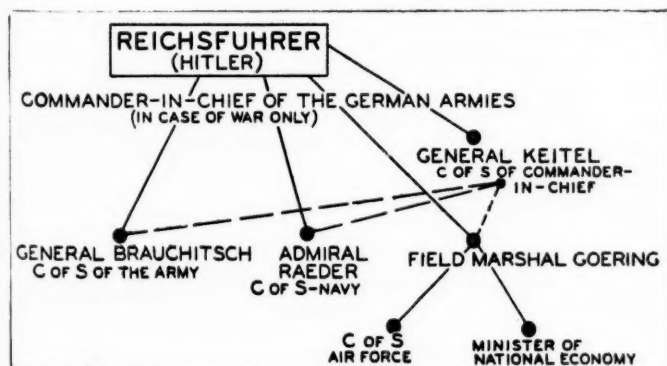
GERMANY

In 1937 the German forces comprised 36 divisions organized into 12 army corps, pertaining to three groups of armies. After the annexation of Austria, it was announced that the number of divisions would be increased to 42 and the number of army corps to 14.

Prior to 4 February 1938, the command of the German armies was organized as follows: Field Marshal Blomberg, who was at the same time Minister of War and Chief of Staff, was commander-in-chief. As assistants, he had General Keitel with a special staff; General von Fritsch, Chief of Staff of the Army; Admiral Raeder, Minister and Chief of Staff of the Navy; and General Goering, Minister and Chief of Staff of the Air Forces.

The Minister of National Economy, Doctor Schacht, depended directly from the Chancellor. However, in case of war, this department automatically came under General von Blomberg.

The new reorganization differs materially from the one described above.



The command of the army is now exercised in peacetime by Chancellor Hitler himself, and in time of war it will be vested on an officer whose name will be announced with the mobilization order. The Reichsfuhrer has the following assistants: General Keitel, Chief of Staff of the Commander-in-Chief; General von Brauchitsch, Chief of Staff of the Army; Admiral Raeder, Chief of Staff of the Navy, and Field Marshal Goering, Chief of Staff of the Air Force.

Although General Keitel has the rank of Minister, he is not minister of war; he only acts according to instructions or in the name of the Chancellor (Hitler).

Field Marshal Goering now controls the Department of National Economy and Dr. Schacht has been replaced by Mr. Funck.

(Revue d'Infanterie, July 1938)

The following information concerning the German Army has been abstracted from the 1939 German Army Register, recently published in Leipzig:

In 1939, the German land army will consist of 52 divisions as follows:

- 39 infantry divisions
- 3 mountain divisions
- 4 divisions, normal type, motorized or light
- 5 mechanized divisions
- 1 cavalry brigade

These divisions have been organized into six army groups, with headquarters as follows:

Group of Armies No. 1—Berlin

- 2—Frankfort-sur-le-Main
- 3—Dresden
- 4—Leipzig
- 5—Vienna
- 6—Hanover

There are six divisions stationed now in Austria: two normal divisions, two mountain divisions, one light division and one mechanized division; in the Sudeten there is one division—the 46th—and part of the 8th Silesian Division.

The country is divided into three aviation groups—East, West and South—and three air regions.

(La France Militaire, 16 December 1938)

Submarines:

On 2 February 1939, DNB—German official news agency—announced that the German government has notified the British government of its intention to build up its submarine tonnage to parity with the British Royal Navy and to arm its new 10,000-ton cruisers with 8-inch guns instead of 6-inch guns.

The intention to achieve parity, means that Germany will more than double its present submarine tonnage of 31,000 tons completed or under construction, since Great Britain's submarine tonnage is about 70,000. However, Germany already has more modern submarines than Great Britain, but they are comparatively small vessels of around 250 tons. The two nations compare in undersea power as follows:

Nation	Built		Building or Appropriated for		Total	
	Number	Tonnage	Number	Tonnage	Number	Tonnage
Great Britain	46	53,560	13	14,600	73	75,910
	*14	7,750				
Germany	43	16,450	28	14,840	71	31,290

*These (14) submarines are all under the obsolescence age.

The vast Danube trade will be greatly increased in 1945 when it is expected that the Rhine-Danube canal joining



THE RHINE-DANUBE CANAL

these two opposite flowing streams will be completed. Vienna may then become Europe's chief distribution center.

The Danube's mileage is small (1,750 miles) compared with that of the Mississippi—Missouri (4,502 miles), the Amazon (4,000 miles), the Nile (4,000 miles), and the Yangtze (3,400 miles).

Last January, celebrations were held in Germany on the sixth anniversary of Hitler's accession to power. He accepted President Hindenburg's invitation to form a government on 30 January 1933. The main events of these six years, in chronological order, are as follow:

1933

- Jan. 30—Hitler named Chancellor
- Oct. 21—Germany withdrew from the League of Nations

1934

- Jan. 26—Ten-year friendship treaty, signed with Poland
- Aug. 2—After von Hindenburg's death, Hitler assumed the title of "Fuehrer of the German People and Chancellor," dropping the office of president.

1935

- Mar. 1—The Saar territory returned to Germany
- Mar. 16—Universal military training decreed
- Jun. 18—Treaty signed with Great Britain, limiting the German Navy to 35 per cent of the British Royal Navy.
- Sep. 16—Nuremberg racial laws ostracized the Jews politically and socially.

1936

- Mar. 7—Reoccupation and remilitarization of the Rhineland.

1937

- Oct. 25—Creation of the Rome-Berlin axis
- Nov. 25—Creation of the anti-comintern pact with Japan

1938

- Mar. 13—Annexation of Austria
- Oct. 1—Annexation of Sudetenland
- Nov. 10—Anti-Jewish campaign breaks out, followed by decrees and laws ostracizing Jews economically after 1 January 1939.

GREAT BRITAIN

The Vickers-Wellesley bomber, which has recently accomplished a non-stop Egypt-Australia flight, is a single motored monoplane. In its construction the "geodetic" system, developed by the engineer Wells, was used. This system involves certain innovations in the construction of wings and the fuselage.

During the flight from Egypt to Australia the ship's weight was 18,380 lbs. When unloaded it weighs 6,350 lbs., and the anticipated full load weight is 11,000 lbs. Thus, the overload was more than 66%, and in spite of this the safety coefficient remained close to 7.

At the present time the "geodetic" system is used in the construction of another, twin-motored bomber, of the Vickers-Wellington type. It will be somewhat smaller than the Wellesley, but will be capable of a non-stop flight from London to Australia, a distance of more than 9,900 miles.

The Wellesley has a wing spread of 75 feet, length 39 feet, area of carrying surface 192 feet. It is equipped with the Bristol "Pegasus" motor of 925 HP. Its best speed at lower altitudes is 178 miles per hour; at an altitude of 13,000 feet—207 miles per hour; cruising speed at 56 per cent of the motor's capacity—187 miles per hour; at 38 per cent—160 miles per hour; landing speed—67 miles per hour. Ceiling (theoretical) 35,260 feet. Cruising range at full load and 38 per cent of the motor's capacity—2,590 miles.

(Krasnaya Zvezda, 15 January 1939)

Antiaircraft Artillery:

The 76-mm antiaircraft gun is not considered powerful enough and the 94-mm will be manufactured in large quantities. The fixed 127-mm will be studied for possible use in antiaircraft coast defense.

Thousands of 20-mm Oerlikon guns have been purchased, possibly as replacement for the 25.4 Vickers automatic guns.

The British antiaircraft defense provides 40-mm Vickers-Armstrong for defense against low flying planes. These guns have a rate of fire of 120 rounds per minute.

(Militar-Wochenblatt, 29 April 1938)

The Territorial Army* will consist of 203,000 men as follows:

- 9—infantry divisions similar to those of the Regular Army each of 9 Bns.
- 3—Motorized infantry divisions of 7 Bns each, one of which is a motorcyclist Bn.
- 1—Mechanized division
- 2—Cavalry brigades
- 5—Antiaircraft divisions.
- Miscellaneous elements.

(Revue Militaire Generale)

*Equivalent to U. S. National Guard.

Antiaircraft Divisions:

The antiaircraft force of the Territorial Army has been increased in a year and a half, from 23,000 to over 70,000. The five AA Divisions are assigned as follow: 1st (London area), 18,000; 2d (Eastern-Northern), 18,000; 3d (Scot-tish), 10,000; 4th (Western), 13,000; 5th (Southern) 15,000.

(United Services Review, 2 February 1939)

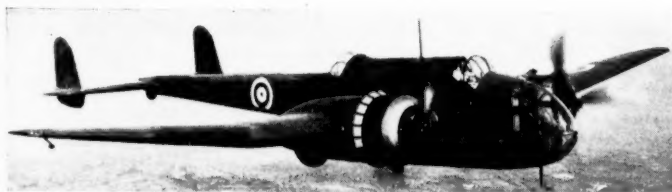
India

The 49 provinces of India—grouped into nine military districts—have an army of 52,000 men. This army is in addition to the regular Indian Army and while its main role is to protect the provinces, it is subject to call by the British authorities in case of emergency. While the regular army tends to mechanization with most of its regiments already mechanized, the Indian Army is composed mostly of cavalry, due to the nature of the country where it is to be employed.

(Deutsche Wehr)

On 9 January 1939, Major General H. C. B. Weymss was appointed director of mobilization to whip Britain's fighting forces into battle trim. He was assistant adjutant general in the War Office from 1935 to 1937 and last year was at the Imperial Defense College.

(The London Gazette)

Royal Air Force:

HANDLEY PAGE HAMPDEN BOMBER

The operational strength of the Metropolitan Air Force is 122 squadrons, including auxiliary squadrons. With very few exceptions, they are reported to have modern equipment and within the next few years they will all have up-to-date equipment with adequate reserves.

The Royal Air Force overseas has a strength of 30 squadrons, excluding the units of the Fleet Air Arm. According to reports, less than one-third of these squadrons have modern equipment and the majority of them are armed with airplanes which are five years old or more.

The disposition and work of the Royal Air Force overseas is as follows:

There are seven Overseas Commands: the Middle East, Iraq, Aden, Palestine and Transjordan, India, the Far East, and the Mediterranean.

The Middle East Command, with headquarters in Cairo, is responsible for the air defense of the Suez Canal, the defense of that section of the Imperial air routes to the Cape, India and the Far East, for the reinforcement of Iraq, Cyprus and the African dependencies, and for the maintenance of internal order in Sudan and, in cooperation with the Egyptian Army Air Force, in Egypt.

The British Forces in Iraq is an air command, with headquarters at Habbaniyah. The squadrons can be used to

reinforce India at short notice, and they are also employed in the defense of the oil pipe-line from Kirkuk to Haifa, a vital link in the chain of Empire defense.

The British Forces in the Aden Protectorate is an Air Command. It has rendered valuable service in the suppression of disturbances.

The India Command is one of the largest of the overseas Air Commands and is paid by the Government of India. It is claimed that it has been neglected in the past in the way of equipment.

The Mediterranean Command has three stations in Malta and provide useful bases for work with the fleet.

The Far East Command is based at Singapore, but there are minor units at Kai Tak and Hong Kong. In time of war the squadrons at Singapore would play an important part in the defense of the base and of the lines of communication to the Far East and Australia.

(The Aeroplane, London, 21 December 1938)

Oil Supplies in Time of War:

The British Empire produces only 5 per cent of its present day requirements. The sources of import supply are largely from ten countries, five in the East and five in the West as follows:

East	West
Dutch Borneo	United States
Iran (Persia)	Mexico
Iraq	Ecuador
Russia	Dutch West Indies
Roumania	Peru

The supplies from Dutch West Indies largely originate in Venezuela.

Should the Mediterranean become untenable, oil from Iraq, through Tripoli and Haifa is lost, and the oil from Persia and Borneo would have to be brought up by way of the Cape, in which case the return trip would take fourteen weeks. Roumanian and Russian supplies by way of the Bosphorus would be cut off. The oil supply from Peru and Ecuador is not large. The main source of oil supply would then be from the United States, Mexico, Dutch West Indies and Venezuela.

(Canadian Defense Quarterly, January 1939)

GREECE

The Army has 3 regiments and 3 separate battalions of mountain artillery, also 1 regiment and 3 separate groups of heavy artillery. Altogether, there are 90 light (360 guns) and 18 heavy (72 guns) batteries. Practically all of the artillery is Schneider manufactured.

Light artillery is armed with 75-mm guns and 85-mm howitzers. The howitzer has a 54-degree traverse, and from minus 6 degrees to plus 65 degrees vertical firing angle; when equipped for field use it weighs 2,130 pounds and has a range of 16,500 yards; the projectile weighs 22 pounds and has initial velocity of 2,160 feet per second.

Heavy artillery—motorized—is armed with Schneider 155-mm howitzers, and the 105-mm L/30 guns.

(Krasnaya Zvezda, 23 October 1938)

GUATEMALA

Military Schools:

The army has the following schools:

Polytechnic School—Training of officer cadets.

Training Schools—Advanced courses for officers.

School for Military Aviation

General Staff Academy—Higher instruction for regular army officers. There are also noncommissioned officers schools.

(Armaments Year-Book)

HAITI

In addition to the "Constabulary," the Republic has a coast guard service and a force of rural police.

The constabulary has a headquarters staff and five military departments.

(Armaments Year-Book)

ITALY

Navy:

Twenty-six heavy long-range submarines of more than 1,000 tons, have been added to the Italian Navy.

Since the Ethiopian War, when Great Britain sent her home fleet into the Mediterranean, Italy started building a strong submarine fleet.

(Forze Armate, 23 January 1939)

Army Organization: The Italian Army is organized as follows:

- INFANTRY** —3 Grenadier Regiments (exclusive of the regiments in East Africa).
 —100 line Regiments (includes 4 motorized in Italy, 12 semi-motorized (auto transportable) of which 4 are in Italy and 8 are in Lybia).
 —12 Bersaglieri Regiments (3 of these pertain to the "Celeri" divisions, and 2 or 3 to the "Corazzata" divisions—formerly Brigades).
 —10 Alpine Regiments.
 —6 Tank Regiments, including the 32d Tank Regiment just organized (2 or 3 of these regiments pertain to Corazzata divisions, formerly Brigades).

- CAVALRY** —12 Regiments (6 of these pertain to "Celeri" Divisions).
 —1 Group of Squadrons.

- ARTILLERY** —38 Regiments, Infantry Division (includes 2 motorized regiments in Italy and 4 in Lybia).
 —3 Regiments "Celeri."
 —5 Regiments "Alpini."
 —14 Regiments, Corps Artillery (mixed group of Sardinia not included).
 —11 Regiments, Army Artillery (Army Artillery Regiments 6-11 incl. are designated as "Frontier Guard Regiments").

- 5 Regiments Antiaircraft (does not include 1 AA Group in Sardinia and 2 AA Groups in Lybia).

ENGINEERS—14 Regiments (does not include the Engineer Battalion of Sardinia).

—2 Bridge Regiments.

—2 Mining Regiments.

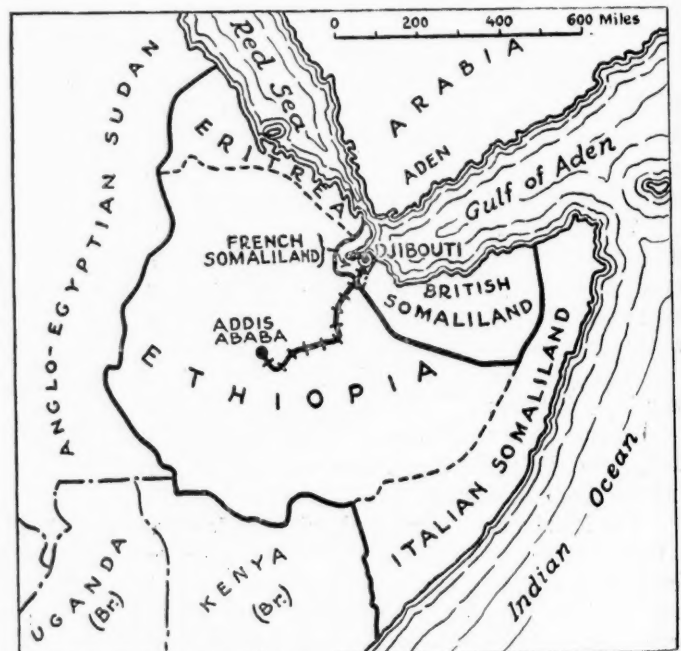
—1 Railway Regiment.

The above figures may be accepted as the strength in regiments of the Italian Army as of 1 December 1938. However, these figures will be changed in the near future due to the reorganization of the Italian Army which is now in progress, which it is understood consists of reorganizing divisions on the 2-Regiment "Bianary" basis, thus creating additional divisions and army corps. There will probably be little increase in the number of infantry regiments, but there will be considerable increase in the number of artillery regiments to provide for the new divisions and corps. It is believed that this increase will be accomplished as far as practicable by taking one battalion from each 4-battalion artillery regiment and forming new 3-battalion regiments. However, this will not fully provide for the additional regiments required and some increase in personnel and weapons will be necessary. It is also probable that several additional engineer regiments will be necessary.

It has also been reported that the "Corazzata" Brigades have been reorganized into Corazzata divisions and that a Corazzata Corps has been formed, as well as a "Motorized Corps" and a "Celeri" Corps and that these three new corps have been organized into an army.

(Italian Army Calendar, 1939—Ministry of War)

Djibouti:



THE DJIBOUTI-ADDIS ABABA RAILROAD

One of Italy's demands from France in the Mediterranean is French Somaliland, the possession of which would round out Italy's East African empire and give her Djibouti

—terminal of the Addis-Ababa railway, a narrow gauge railroad line 500 miles long, between Djibouti on the Red Sea and Addis-Ababa. This railroad forms the chief outlet of Italy's new Ethiopian Empire. The Italians contend that it is French owned, has its eastern terminus in a French port, while deriving virtually all its traffic from Ethiopia, because only fifty miles of the line runs through French territory.

At present there is a train leaving Djibouti on Mondays and Addis Ababa on Fridays. The running time is twenty-six hours.

Last January, Senegalese troops sent from Marseilles to reinforce the Somaliland frontier, landed at Djibouti. France has now reoccupied twelve and one-half miles of Somaliland coastline bordering Eritrea (Italian). The re-occupied district, lying close to the Strait of Bab-el-Mandeb, comprises an area of approximately 300 square miles and had been ceded by France to Italy in 1935.



The Italians are laying chief claim to Tunisia and also covet Corsica, the region around Nice and part of Savoy further North.

The French have a great air base at Bizerte and the British have one at Malta. Italy has bases at Cagliari, Palermo and has been fortifying the island of Pantelleria for some time.

JAPAN

A new air service is to be opened by Japan—from Tokyo to the Pelew Islands.

(The Aeroplane, 4 January 1939)

MEXICO

On 27 December 1938, the Chamber of Deputies passed an amendment to Mexico's Constitution providing that exploitation of oil and hydrocarbons shall no longer be a

matter of concessions for private companies but shall be handled directly by the government.

The Chamber has approved larger appropriations for national defense.

NETHERLANDS

The army which was increased last September from 12,000 to 40,000 men, will be further augmented by two mechanized regiments.

(La France Militaire, 1 December 1938)

NICARAGUA

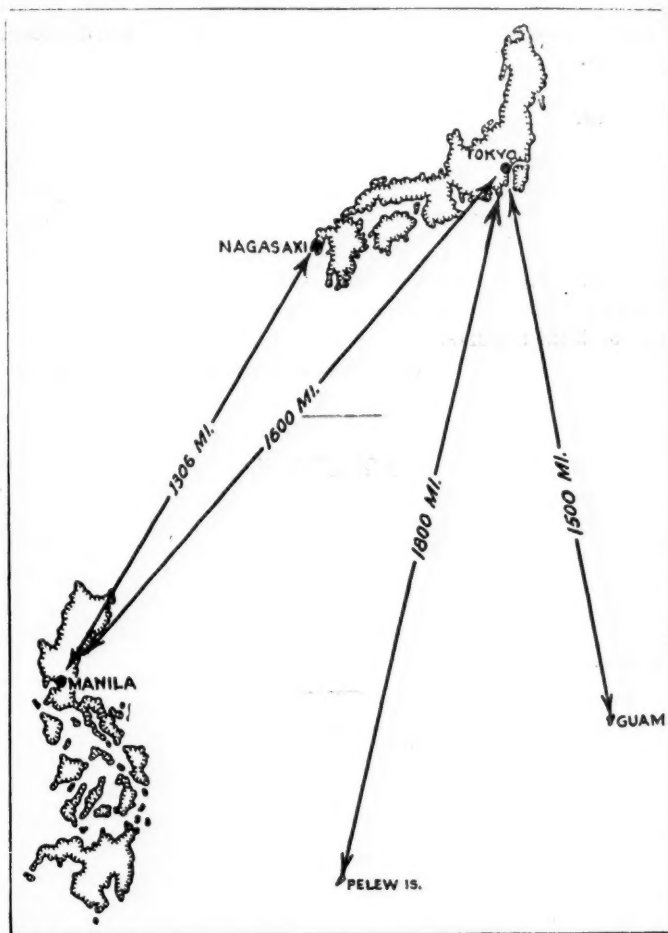
The National Guard is the only armed force which the country possesses; it performs the dual functions of an army proper and of a rural and urban police. Enlistment is voluntary, for a period of three years.

(Armaments Year-Book)

NORWAY

With a population of approximately 2,800,000 Norway has a peace time army of from 18,000 to 30,000 men.

The artillery consists of 9 battalions of light artillery (24 horse-drawn batteries), 2 mountain artillery battalions



NEW AIR SERVICE TOKYO-PELEW ISLANDS

(7 batteries), 1 heavy artillery battalion (3 batteries, motorized), fortress artillery, 1 antiaircraft artillery battalion (3 batteries) and 14 fixed antiaircraft batteries.

The light artillery is equipped with a 120-mm Konsberg howitzer, with a range of 11,500 yards; the heavy artillery is equipped with a modern 105-mm gun.

(*Artilleristische Rundschau*, August 1938)

PANAMA

Tolls at the Panama Canal for the first eleven months of 1938 totalled \$20,577,538.21 as compared with \$22,105,024.75 for the first ten months of 1937.

The average number per month of vessels transiting the canal varies from 450 to 550.

PERU

The three leading Latin American countries supplying the largest share of Peruvian imports were Argentina, Chile and Ecuador.

Imports:

The principal suppliers of Peruvian purchases during 1937 and the first semester of 1938 were the United States, Germany, Great Britain and Argentina, in that order. These countries furnished over 70 per cent of Peru's total imports.

Exports:

In regard to exports, the United States is now the principal purchaser of Peruvian exports, replacing Great Britain. As in the case of imports, a few countries purchased the bulk of Peruvian sales. They were the United States, Great Britain, Germany, Argentina and France, the combined total of which amounted to approximately 70 per cent of total exports.

(*Statistical Division, Pan American Union*)

POLAND

On 20 December 1938, Poland and Russia concluded an agreement providing for the expansion of Soviet-Polish trade from a present total of around \$750,000 to between \$26,000,000 and \$30,000,000. It is said that the common fear of Germany's rising power is making friends of these former enemies.

PORTUGAL

Fourteen air officers have gone to Germany in order to accept deliveries of the ten J.U.-86 bombers which had been ordered by the government. Before returning to Portugal these officers are to follow a specialist course, but no details are available.

Two other commissions will be leaving Portugal in a few weeks' time, one to collect ten reconnaissance machines

from Italy, and the other to bring back fifteen pursuit planes from England.

(*Royal Air Force Quarterly*, January 1939)

RUMANIA

An agreement between Rumania and Yugoslavia, including a determination to defend their territorial integrity, was announced on 2 February 1939. The points agreed upon included:

1. Reiteration of decisions to defend their present borders.
2. Determination to adopt a "conciliatory attitude" toward all countries in the Danubian basin, particularly Hungary and Bulgaria.
3. Approval of plans to construct a highway connecting Trieste with the Black Sea, to pass through Zagreb, Belgrade and Bucharest.
4. Maintenance of present alliances between Rumania and Yugoslavia.

RUSSIA

The Commissariat for Defense Industry has been split into four parts, by a decree dated January 12, 1939.

- (a) Aviation industry.
- (b) Shipbuilding industry.
- (c) Military stores including factories producing military supplies and explosives.
- (d) Armament, including artillery, small arms factories and plants making optical instruments.

Motorization:

Russia is pushing on fast with a radical program for motorization and mechanization of her army. In the 1937 maneuvers all transport was motorized; a company of amphibious tanks formed part of each infantry regiment and a battalion part of each division. The present projects include the formation of small combat teams of infantry, tanks and artillery units as far down as regiments and battalions. The Russian moto-mechanized brigade has 27 medium tanks, 228 light tanks, 10 sections of motorized artillery and a two-battery battalion of field artillery, and has combat cars and motorcycles for distant reconnaissance purposes.

(*Bulletin Belge des Sciences Militaires*)

According to the foreign press, the purges known to date in the Russian Army are as follows:

The four commissars of national defense have disappeared.

- (1) Chief of Political Bureau Gamaruck—suicide.
- (2) Marshal Toukhatchewski,
- (3) Chief of Navy, Admiral Orlov, and
- (4) Chief of military aviation, shot for treason.

Same accusation now against one of their successors, Marshal Iegorow.

Others of the same commissariat before firing squad:

- the chief of personnel bureau, General Feldman
- the chief of aerial protection, Siedakme
- the commander of mechanized troops, Vokis
- the former commandant of communication troops, Shalepska
- the chief of veterinary service, Nikolski
- the chief of railways department, Apoga
- the inspector of artillery, Koulik
- the commandant of the Ecole Supérieure de Guerre, Kork
- the chief of the Political-Military Academy, Ippo
- the chief of the Intendance, Schiffrès
- the chief of the department of foreign affairs of the commissariat of national defense, Gekkei.
- the inspector of the service of sports in the army.

Commanders of military regions that have met the same fate:

- the commander of the Kiev region, Gakio
- the commander of White Russia region, Ouborevitch
- the commander of Northern Caucasus, Kachiring
- the commander of Kharkow, Doubovoie and his representative Gailit
- the commander of Transbaikal, Griasnow, and his representative Velikanow as well as the seconds in command of the following regions: Red Army in the Far East, regions of Moscow and Leningrad.

Among the officials of the Political Bureau of the Red Army who have been shot are:

Commissars Bouline and Osepiave, political chiefs of the military region of Aaroustaman, Moscow; Veklitchow, of North Caucasus; Ameline of Kiev; Kolhemikow, of Kharkaw; Orlow, of Volga; Mesis, of White Russia; Apre, of Trans-Caucasia.

In the navy—besides Admiral Orlow—Admiral Victorou, second in command; the commander of the Baltic Sea Fleet, Sirkow; the commander of the Black Sea Fleet, Kochanow; the commander of the Pacific Sea Fleet, Kireien.

Besides the commander of the Far East Army, Marshal Blucher and the commander of the North Sea Fleet, Douchenkow, all the commanders of military regions or fleet have disappeared. Other high ranking officials also; all told numbers reach the thousands.

In the three western regions (Moscow, White Russia and Kiev) all the army corps commanders have been removed; during last year 40% of the officers with the troops have disappeared; thus we have today colonels commanding divisions, many regiments commanded by captains and even by lieutenants, as for example the present chief of aviation of the Leningrad region—Colonel Kopetz—who during the September 1937 elections was listed as a lieutenant in the candidates list and who today holds that important position.

It is reported that there is grave irritation and exasperation among the officers still in service.

In spite of progress in equipment and modernization, the Russian Army will remain weak for some time and unable to be employed in the field; it is not an important factor at present as witnessed by the events in the Far East, between Japan and China and the recent crisis between Poland and Lithuania.

(Revue Militaire Suisse, October 1938)

Far Eastern Army:

The Far Eastern Army has been divided into two independent groups under command respectively of Generals Stern and Komeu. Nothing has lately been heard of General Blucher, War Lord of all Siberia until recently.

(United Services Review, 8 December 1938)

Ukraine:



UKRAINE—A LAND OF RICH RESOURCES

According to *La France Militaire* and other publications, the Soviet Union is hastening the construction of a formidable "Maginot Line" in order to protect the Ukrainian wheat and coal fields from invasion.

The approved program includes the following points:

- (1) Deforestation and depopulation of a defensive zone along Ukraine's western frontier.
- (2) Construction of a Maginot Line of defense along this boundary.
- (3) Speeding up a railroad and highway construction to facilitate transfer of supplies and troops.
- (4) Development back of this area of big military concentration centers together with well fortified and provisioned air bases.

Ukraine is one of the four original republics which formed the U.S.S.R. in 1923 and is among the richest sections of the Soviet Union. It is considerably larger in area and population than either of its western neighbors, Poland and Rumania. Richly endowed with natural resources, the Ukraine in the past decade has become a powerful region. In 1937, its coal output was 67 million tons—half of U.S.S.R.'s coal—while its pig iron output of 9 million tons was one-half of the Soviet's total production. Agriculture re-

mains today an immensely important source of Soviet wealth. Ukraine is Russia's greatest cereal growing country. It is the chief European source of quicksilver and its wealth of valuable mineral resources is virtually unexplored as yet.

Russian Ukraine covers an area of 664,635 square kilometers with about 30,000,000 inhabitants. However, the whole territory, inhabited by Ukrainians is unequally divided among the following states: Russia, Poland, Rumania, Czechoslovakia and Hungary. According to the census of 1931, 4,441,000 Ukrainians lived in Poland; 600,000 in Rumania (Bukovina and Bessarabia); 500,000 in Czechoslovakia (Ruthenia) and 80,000 in Hungary in the territory ceded by Czechoslovakia.

(*La France Militaire*, 19 January 1939, and other foreign publications)

The New Soviet Oath—Military oath, according to a text recently adopted, was administered on February 23d to every member of the Soviet land, air, and naval forces.

The wording of the new oath is dignified, with an emphasis on patriotism, rather than on internationalism.

Conspicuous by absence from this document are former vows to liberate the toiling masses of the world. Such conventional expressions as "Citizen," "Native Country," and "Government," appear in the new oath.

(*Krasnaya Zvezda*, 15 January 1939)

The veterinary hospital of the Moscow garrison is conducting interesting experiments with a new, pneumatic machine for the cleaning of horses.

The machine operates by suction and is equipped with an electrically driven ventilator. Special boxes contain brushes and combs. The suction action deposits the impurities and hair in a special receptacle.

Twenty horses can be cleaned simultaneously by the machine.

(*Krasnaya Zvezda*, 16 January 1939)

Efficiency of Soviet troops in the throwing of hand grenades can be judged from a report concerning results obtained during a competition recently held in the Ural Military District. Best distance obtained by a grenade thrower was 56 yards, with the next best at 55 yards.

(*Krasnaya Zvezda*, 17 January 1939)

The Military Publishing House at Moscow has announced extensive plans for publishing a series of works dealing with the strategy and tactics employed by Soviet forces against the White armies of Kolchak, Denikin, Wrangel, Yudenich, as well as against the Poles. Also planned is a textbook on history of the World War to be used in higher Army schools, and other works devoted to individual operations in 1914-18.

(*Krasnaya Zvezda*, 25 January 1939)

SIAM

Siam and French Indo-China are to be separated by a neutral zone between their frontiers approximately 15 miles wide, where the frontiers adjoin along the Mekong River according to the provisions of friendship and trade treaties

signed in Paris on 13 December 1938, which replaces the former accord between France and Siam.

(*Asia*, February 1939)

Navy:

In proportion to size Siam is carrying out the largest of all rearmament programs.

In a remarkably short time she has enlarged her navy from fifteen vessels to fifty. With two cruisers of 10,000 tons, two coast defense ships with 8-inch guns, a destroyer, two escort vessels, 15 torpedo boats, four submarines, eight motor torpedo boats, and 17 gunboats, patrol boats and mine layers, Siam will be as strong as Australia and second only to Japan as a sea power of the Orient.

(*United Services Review*, 5 January 1939)

SWEDEN

The Royal Coast Artillery is attached to the navy and is under the command of a general officer, Chief of Coast Artillery. The most important harbor defenses are those of Vaxholm (outside of Stockholm), Karlskrona, Alosborg (outside Gothenburg) and Hemsö (outside Harnosand).

(*Statesman's Year-Book*, 1938)

SWITZERLAND

On 1 January 1939 the new Swiss organization came into force and the changes introduced are now being tested. In regard to artillery, the infantry division now has one regiment of field artillery (three battalions each of three batteries) and one battalion of two batteries of 105-mm guns. The former howitzer batteries of the division are now grouped into two regiments allotted to the army corps.

It must be borne in mind that Switzerland is surrounded by powerful neighbors and her policy is strictly defensive action.

(*Foreign Press*)

Switzerland has entered into a full phase of rearmament. The "National Defense Loan" and other appropriations voted for national defense, now reach a grand total of 600,000,000 francs.

Manufacture of arms is being expedited. The infantry will be equipped with a new mountain cannon, of which a few batteries already have been delivered. The 24-mm antitank gun, now under trial, will probably be assigned to the infantry.

Firing tests of anti-aircraft guns have been conducted and the following types have been selected:

- (1) 75-mm Schneider gun
- (2) 34-mm automatic guns, built by the arms factory in Bern
- (3) Pieces of smaller caliber—Oerlikon models.

Gas masks are available for the entire army. In addition there is available a type of gas mask for the civil population which can be bought at a very reduced price.

(*Swiss G. S. Statements to Press*)

TURKEY

On 4 December 1938, the Ministry of National Economy awarded to Swan, Hunter & Wigham Richardson of Newcastle, England, a contract for eleven merchantmen of 900 to 1,800 tons each at a total cost of \$9,000,000, payable from the \$50,000,000 credit obtained from Great Britain in May 1938.

URUGUAY

The country is divided into four military areas, to each of which is allotted a brigade.

There is a police force, which is organized into units, and possesses a military character from the point of view of training, command, armament and discipline.

There are also an urban and rural police force, a Customs police force, a Metropolitan Guard and the Civil Guards.

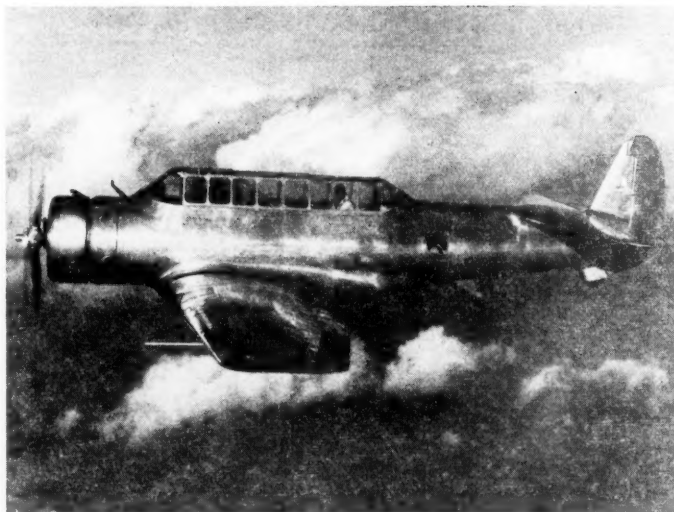
(Armaments Year-Book)

VENEZUELA

On 7 December 1938 Venezuela and Brazil signed in Caracas a treaty on non-aggression, conciliation and arbitration, which provides that all controversies arising from the interpretation of a treaty or from any point of international law shall be submitted to the Permanent Court of International Justice. A Permanent Commission of five members was also created.

At the same time an extradition treaty between the two countries was signed in Rio de Janeiro.

(Bulletin of the Pan American Union, Feb. 1939)



U. S. Air Corps

LAND AND AIR FORCES OF NATIONS OF THE WORLD AND

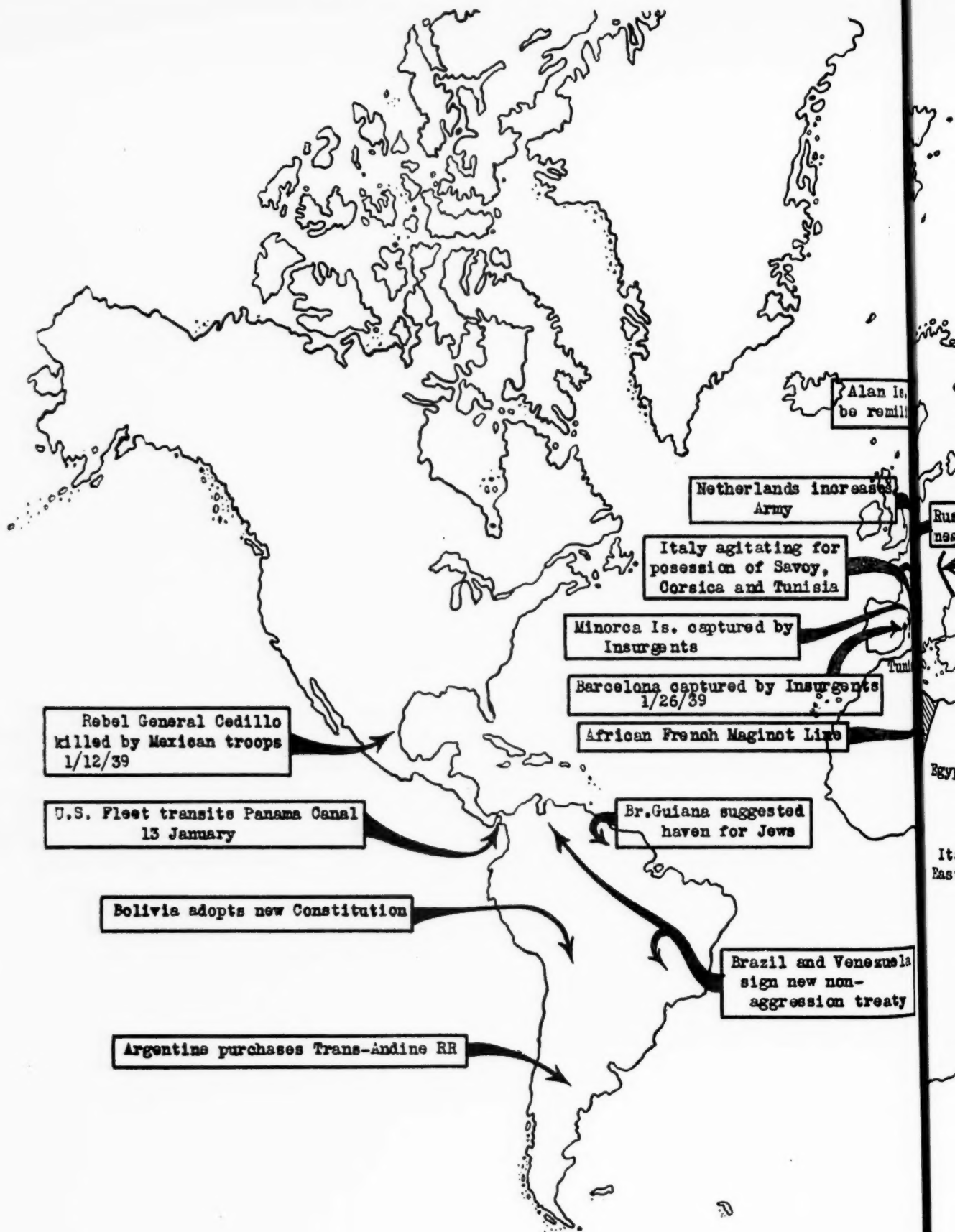
Nation	Army			Air Force			Status of Air Force	Total Land and Air Force
	Regular Army	Trained Reserves	Total	Regular Army	Trained Reserves	Total		
EUROPE								
Belgium.....	96,300	700,000	796,300	2,300	100	2,400	In Army	796,300
Bulgaria.....	51,600	650,000	701,600	1,600		1,600	In Army	703,200
Czechoslovakia.....	200,000	1,700,000	1,900,000	6,600		6,600	In Army	1,900,000
Denmark.....	11,000	90,000	101,000	1,000		1,000	In Army	101,000
Estonia.....	11,500	109,000	120,500	600		600	In Army	120,500
Finland.....	29,300	261,000	290,300	1,300		1,300	In Army	290,300
France.....	750,000	5,500,000	6,250,000	65,000	7,000	72,000	Separate	6,322,000
Germany.....	1,000,000	4,000,000	5,000,000	200,000	25,000	225,000	Separate	5,225,000
Greece.....	80,000	500,000	580,000	2,200	4,600	6,800	Separate	586,600
Hungary.....	60,000	700,000	760,000	2,200		2,200	In Army	760,000
Italy.....	1,000,000	6,500,000	7,500,000	105,000	350,000	455,000	Separate	7,955,000
Latvia.....	21,000	200,000	221,000	400		400	In Army	221,000
Lithuania.....	25,000	290,000	315,000	800		800	In Army	315,000
Netherlands.....	40,000	200,000	240,000	600		600	In Army	240,000
Norway.....	15,000	125,000	140,000	1,000		1,000	In Army	140,000
Poland.....	280,000	1,500,000	1,780,000	10,000		10,000	In Army	1,780,000
Portugal.....	55,000	480,000	535,000	1,000		1,000	In Army	535,000
Rumania.....	215,000	1,600,000	1,815,000	13,000		13,000	In Army	1,815,000
U.S. Soviet Russia.....	1,500,000	16,500,000	18,000,000	100,000		100,000	In Army	18,000,000
Spain.....	No accurate data available on account of the Civil War							
Sweden.....	50,000	580,000	630,000	1,000		1,000	Separate	631,000
Switzerland.....	350	450,000	450,350	5,500		5,500	In Army	450,350
Turkey.....	132,500	530,000	662,500	3,400		3,400	In Army	662,500
Yugoslavia.....	166,500	1,650,000	1,816,500	8,200	17,000	25,200	In Army	1,816,500
BRITISH COMMONWEALTH OF NATIONS								
Australia.....	2,200	35,000	37,200	2,400	400	2,800	Separate	40,000
Canada.....	5,200	48,000	53,200	1,100	500	1,600	In Army	53,200
Great Britain.....	208,500	360,000	568,500	85,000	26,000	111,000	Separate	679,500
India.....	159,000	140,000	299,000	200		200	Separate	299,200
Ireland.....	6,300	15,500	21,800	300	150	450	In Army	21,800
New Zealand.....	500	8,000	8,500	400	200	600	Separate	9,100
South Africa.....	2,800	15,000	17,800	700		700	In Army	17,800
AMERICA*								
Argentina.....	49,700	232,800	282,500	2,000		2,000	In Army	282,500
Bolivia.....	24,700	83,000	107,000	400		400	In Army	107,000
Brazil.....	98,700	213,300	312,100	2,700		2,700	In Army	312,100
Canada.....	See British Commonwealth of Nations							
Chile.....	36,600	160,000	196,600	1,900	800	2,700	In Army	196,600
Colombia.....	14,800	50,000	64,800	1,350		1,350	In Army	64,800
Costa Rica.....	600		600					600
Cuba.....	14,600	48,000	62,600	200	110	310	In Army	62,600
Dominican Republic.....	3,000	12,000	15,000	20		20	In Army	15,000
Ecuador.....	5,500	40,000	45,500	450		450	In Army	45,500
El Salvador.....	3,400		3,400	100		100	In Army	3,400
Guatemala.....	6,000	30,000	36,000	100		100	In Army	36,000
Haiti.....	2,700	600	3,300					3,300
Honduras.....	2,450	2,600	5,050	100		100	In Army	5,050
Mexico.....	48,500	63,500	112,000	650		650	In Army	112,000
Nicaragua.....	2,450	500	2,950	50		50	In Army	2,950
Panama.....		1,078	1,078					1,088
Paraguay.....	12,200	88,000	100,200	200		200	In Army	100,200
Peru.....	11,000	20,000	31,000	1,700	70	1,770	Separate	32,700
Uruguay.....	8,800	24,000	32,800	300		300	In Army	32,800
Venezuela.....	13,700	3,000	16,700	200		200	In Army	16,700
ASIA								
China.....	4,000,000	4,000,000	8,000,000	10,000	10,000	20,000	In Army	8,000,000
Japan.....	2,000,000	4,500,000	6,500,000	30,000	30,000	60,000	In Army	6,500,000

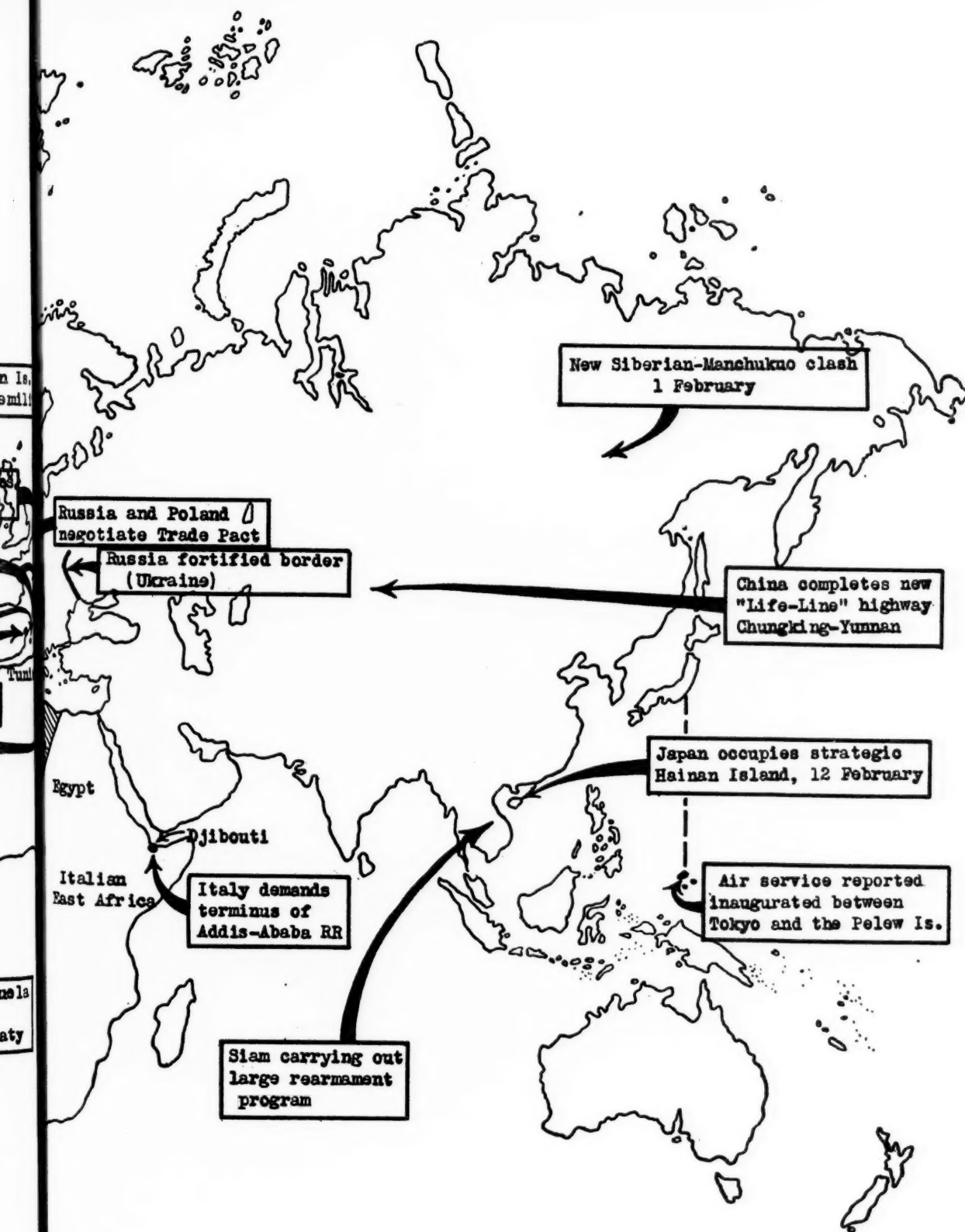
*United States excepted.

COMPARATIVE STRENGTH OF PRINCIPAL NAVIES—1 MARCH 1939

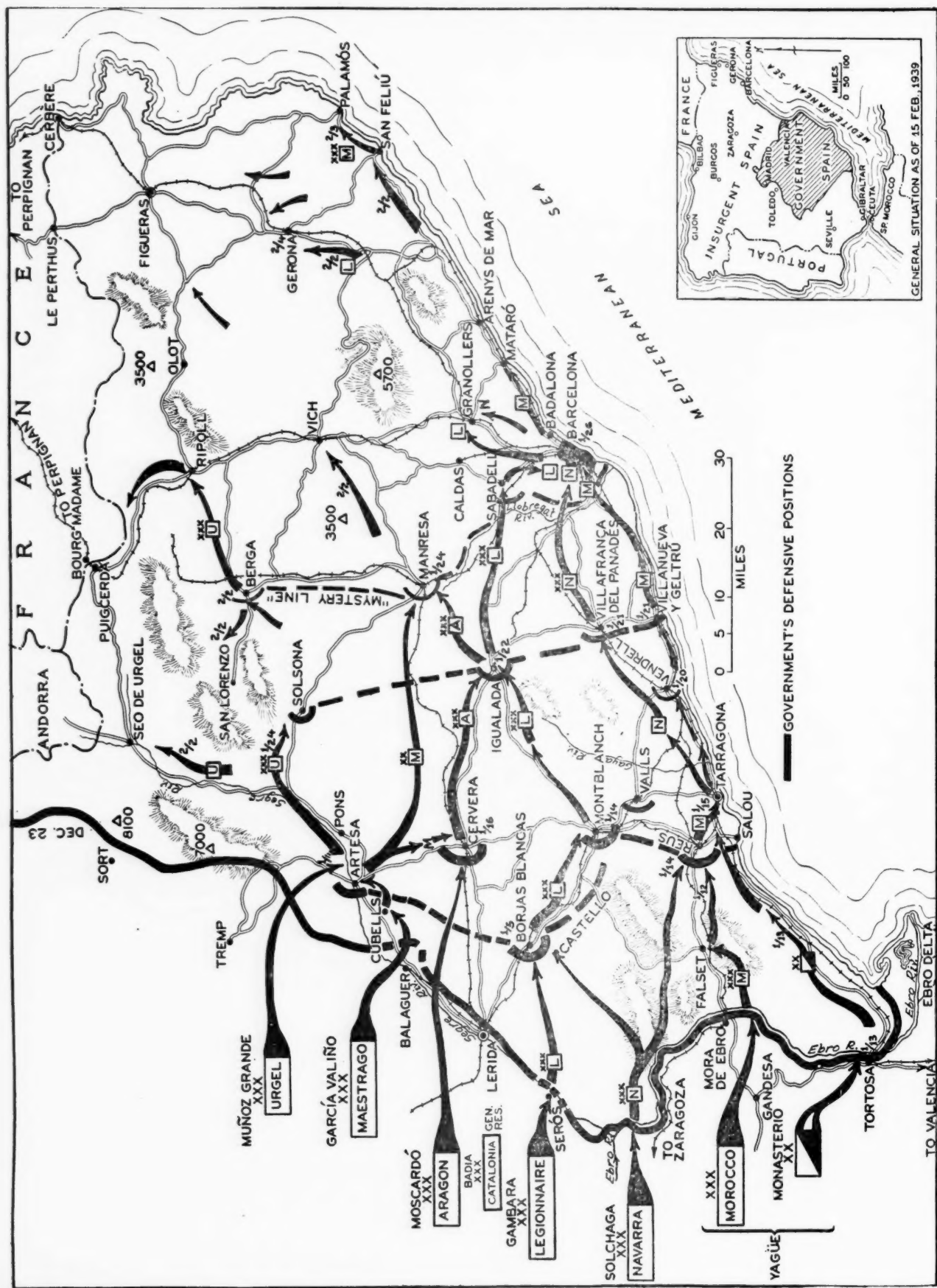
Relation of Population to Trained Forces and Manpower				Principal Navies				Remarks	
Population	Per Cent of Trained Force to Population	Maximum Military Manpower	Per Cent of Trained Force to Maximum Military Manpower	Built	Building or Appropriated for	Total Tonnages	Personnel		
EUROPE									
8,500,000	9.4	1,800,000	44.2					Includes Gendarmes and Colonial Troops.	
6,300,000	11.6	1,200,000	52.5						
15,200,000	12.5	3,000,000	63.3						
3,700,000	2.7	700,000	14.4						
1,200,000	10.4	250,000	48.1						
3,700,000	7.8	750,000	29.0					Population of Colonies: 66,200,000 Includes antiaircraft units.	
42,800,000	14.8	8,500,000	63.2	514,336	269,653	783,989	77,400		
80,000,000	6.5	16,000,000	32.5	210,194	276,069	486,263	50,000		
7,000,000	8.5	1,400,000	41.8						
9,000,000	8.4	18,500,000	41.1						
44,500,000	17.8	9,000,000	88.2	439,294	247,174	686,463	63,400	Colonial Troops, exclusive.	
2,000,000	11.1	400,000	55.3						
2,500,000	12.6	500,000	63.0						
8,500,000	2.8	1,800,000	13.3						
2,900,000	4.8	600,000	23.3						
34,500,000	5.2	8,000,000	22.3					18,000 Police and 10,000 Colonials, inclusive. Army and Navy Air Forces included.	
7,300,000	7.3	1,400,000	38.3						
19,500,000	9.3	3,800,000	45.4						
170,000,000	10.6	34,000,000	53.0	200,000	100,000	300,000	40,000		
6,300,000	10.0	1,200,000	52.5						
4,200,000	10.7	800,000	55.3					Officers and noncommissioned officers only.	
16,500,000	4.1	3,500,000	18.8						
15,400,000	11.8	3,000,000	60.5						
BRITISH COMMONWEALTH OF NATIONS									
6,900,000	0.6	1,300,000	3.1	British Royal Navy					
11,500,000	0.5	2,300,000	2.4						
47,600,000	1.4	9,500,000	7.1						
370,000,000	0.08	10,000,000	3.0	1,362,750	522,450	1,885,200	121,000		
2,900,000	0.8	600,000	10.0						
1,500,000	0.6	300,000	3.0						
9,900,000	0.2	1,800,000	1.0						
AMERICA*									
12,700,000	2.2	2,500,000	11.3						
3,200,000	3.3	650,000	16.5						
43,000,000	0.7	8,500,000	3.6						
4,600,000	4.3	900,000	21.8						
8,700,000	0.7	1,700,000	3.8						
610,000	0.1	100,000	0.6					Includes the Guardia Nacional.	
4,200,000	1.5	800,000	7.8						
1,600,000	0.9	350,000	4.3						
3,000,000	1.5	600,000	7.6						
1,600,000	0.2	300,000	1.1						
2,500,000	1.4	500,000	7.2					Trained Reserves include Urban Police. National Police: 97 Officers and 981 Men.	
2,700,000	0.1	500,000	0.6						
1,000,000	0.5	200,000	2.5						
19,200,000	0.6	3,800,000	3.0						
1,000,000	0.3	200,000	1.5						
470,000	0.2	90,000	1.2						
1,000,000	10.0	200,000	50.0						
6,300,000	0.5	1,300,000	2.5						
2,100,000	1.5	400,000	8.1						
3,500,000	0.5	700,000	2.4						
ASIA									
486,000,000	1.7	40,000,000	20.0	918,500	68,260	986,760	110,000	Data continuously changing due to the war with China.	
72,000,000	9.1	15,000,000	43.3						

*United States excepted.





The Spanish Civil War



The Spanish Civil War



Wide World Photos

INSURGENT COLUMN MOVING UP TO TAKE PART IN THE CATALONIA OFFENSIVE

THE CONQUEST OF CATALONIA

The long overdue "win-the-war" Insurgent offensive was launched at dawn on 23 December 1938, with battering blows all the way on a 100-mile front from Tremp to Tortosa on the estuary of the Ebro River. After a bloody campaign the city of Barcelona, main objective of the Catalonia Drive, fell into Insurgent hands on 26 January and ten days later the Republican Army of Catalonia and Government officials had fled into France.

The Insurgent drive had been carefully prepared and planned. Three main plans had been considered, each of which had as its objective the cities of Madrid, Valencia and Barcelona, respectively. Although Insurgents preferred the capture of Madrid, owing to the great moral repercussion that such a victory would have, this plan was discarded in view of past failures and also because it involved tremendous difficulties. The capture of Valencia would give Insurgents control of the rich Levant country and inflict a serious defeat to the Government, but it would not deal a mortal blow. The plan of a dual offensive against both Valencia and Barcelona was also taken into consideration, and was rejected because it would involve division of effort. After long deliberation, the Insurgents decided to concentrate everything they had against Barcelona. The capture of this important city would be a disastrous blow to Government Spain, as it would cut off all government connection with France, "from whom," according to an Insurgent paper, "they receive every kind of stores, materials, munitions and supplies as well as men," and would disorganize the Government compelling its officials to seek refuge abroad or return to Madrid or Valencia.

After the fighting in the Ebro salient last July, the Insurgents were completely reequipped with more machine guns, better artillery and bigger reserves of munitions. Their forces were reorganized and the "Nationalist Army

of Catalonia" was formed consisting of seven army corps, shown on the general map, as follows:

- (1) CATALONIA Corps, General Badía, commanding.
- (2) URGEL Corps, General Muñoz Grande, commanding.
- (3) MAESTRAGO Corps, General García Valiño, commanding.
- (4) ARAGÓN Corps, commanded by General Jose Moscardó, of Toledo Alcazar fame.
- (5) LEGIONNAIRE CORPS, composed of the Italian "Littorio" Division ("binaria" type) and three mixed Spanish-Italian divisions, commanded by the Italian General Gastone Gambara.
- (6) NAVARRA Corps, commanded by General José Solchaga.
- (7) MOROCCAN Corps, with Monasterio's cavalry division attached, commanded by General Juan Yagüe.

All these corps, with the possible exception of the Catalonia Corps, which was held in general reserve, consisted of from three to four divisions, so that the strength of the Insurgent "Army of Catalonia" was approximately 28 divisions with a total of about 300,000 well equipped, experienced and well trained men, commanded by the best military brains of the Insurgent command. For the first time in this war, the Insurgent forces were at least equal and possibly slightly superior in numbers to the Government forces. Not overlooking anything important, General Franco had left two distinguished commanders on the Valencia front—Generals Varela and Aranda—entrusted with the mission of containing the Levante Army in Central Spain, commanded by General Miaja; the southern front, with headquarters at Seville, had been left under the command of General Queipo del Llano, who has always shown resourcefulness in that section of Spain where he had been born and with which he is so well acquainted. General Dávila was nominally in

command of the Insurgent forces, although General Franco himself, was the actual leader during the offensive.

Against this expected drive, the Government had been building for nearly a year and a half a heavily fortified line, running from strategic Artesa—Borjas Blancas—Montblanch—Reus to the sea, across a network of communications from the west of Barcelona. In addition, two other defensive lines had been prepared: the Solsona—Igualada—Villafranca del Panadés—Villanueva y Geltru position, and the so-called "mystery line" extending from Berga to Manresa, thence along the Llobregat River—west of Barcelona—to the sea. As shown on the General Situation Map, trenches had also been constructed in the outskirts of Barcelona for close-in defense of the city. Of all these lines, the Artesa—Borjas Blancas line was the strongest. Instead of concrete and steel lines, like the famous iron ring around Bilbao which the Insurgents shattered, the Government has installed powerful field works, concrete pill boxes, wire entanglements, concrete bomb-proof and elaborate trenches, varying in depth from two to seven miles. In addition, the Government position, particularly north of Balaguer, was naturally very strong as it was protected not only by the spurs of Sierra Llarga, but also by the deep banks of the Segre River, all bridges over which had been destroyed while machine gun nests had been strategically located to cover all possible river crossings. The Balaguer—Borjas Blancas position had one unpardonable weakness, namely, it had no switch positions, with the result that the attack, following the Insurgent's tactics of outflanking the fortifications, never came from the expected direction. That the Government did not learn this lesson as a result of its experience with the iron ring at Bilbao and the operations at Teruel and Castellón, where Franco used the same tactics, seems hard to explain.

General Franco had advanced his field headquarters from Zaragoza to the centrally located city of Lérida and had divided the theater of operations into two sectors: the northern sector, covering the territory north of the Lérida—Barcelona highway and the southern sector covering the section south of this highway inclusive.

After severe fighting, the Aragón Corps smashed through the formidable line of fortifications north of Balaguer, 16 miles northeast of Lérida. This breach was exploited by both the Aragón and the Maestrago Corps. While the Urgel Corps was attacking Artesa from the northeast the Maestrago Corps advanced from the southwest and on 31 December captured the village of Cubells, on the Lérida—Seo de Urgel road, six miles southwest of Artesa. From Cubells, García Valino struck across the mountainous country and worked his way to the rear of Artesa, where he made contact with a division of the Urgel Corps which had succeeded in crossing the Upper Segre and advancing through the Monsech mountain range was enveloping Artesa from the north. By 3 January, the double envelopment of the Artesa fortifications had been completed and while the defenders offered bitter resistance, they were compelled, after a fierce struggle, to abandon the successive lines of trenches and pillboxes. Artesa—the "Key to Catalonia"—was captured the following day.

Cervera, a village of 4,000 inhabitants and important road center, was captured on 16 January under a concerted

attack by the Aragón and Maestrago Corps from the west and north, respectively.

In the southern sector, the Government lines were pierced near Serós in the lower Segre. The Legionnaire Corps advanced against Borjas Blancas from the southeast, but was held up by the obstinate resistance offered by General Lister's Fifth Republican Corps, which delivered several sharp counterattacks. In the meantime, a column of the Navarrese Corps advanced against Borjas Blancas from the south and smashing through the Government defenses on the southern side captured the village of Castello and prepared to envelop Borjas Blancas from the southwest. This turning movement compelled a withdrawal of Lister's Corps to the east and Borjas Blancas, the keystone of the position, was captured on 4 January. The Legionnaire Corps continued its advance to the southeast along the Lérida—Tarragona highway, enveloped Montblanch from the north, capturing this strategic point on the 11th.



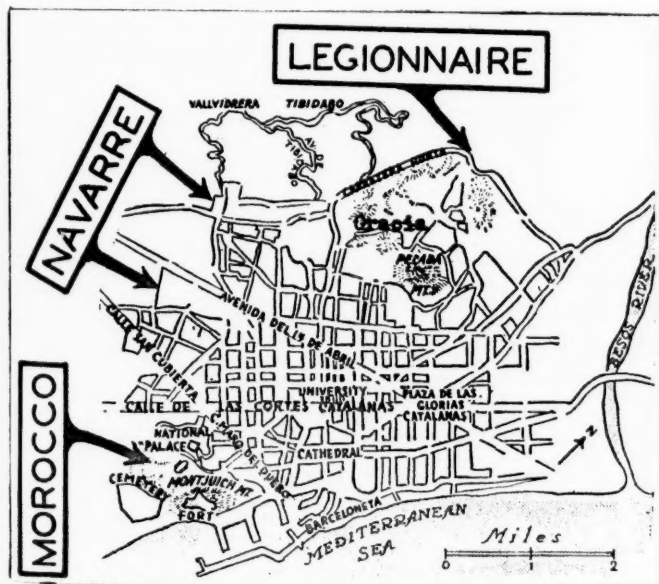
INSURGENT CAVALRY ON A RECONNAISSANCE MISSION

The bulk of the Navarrese Corps advanced on Falset, from the northeast while Yague's Moroccans were also advancing against this town from the southwest. Falset was captured by the Moroccan Corps on the 12th. This town of 8,000 inhabitants near the lead and manganese mines, is in the heart of a road net controlling southern Catalonia. The loss of Falset, within 10 miles from the Mediterranean, threatened to bottle up the Government Army between Tarragona and Tortosa and in order to escape from this trap, the Government forces fell back toward Tarragona. On 13 January, Monasterio's Cavalry Division crossed the Ebro, occupied Tortosa and immediately pushed on to the northeast. Tortosa lies at the head of the Ebro delta, is the chief town of the coastal salient and had held since the Insurgent great drive to the sea last March.

The Navarrese Corps captured the walled town of Valls, key Government air base. The twin drive of this corps from the north and that of the Moroccan Corps from the southwest resulted in the capture of Reus, Government munitions center, situated nine miles west of Tarragona. The concerted action of these two corps resulted also in the capture of Tarragona—second most important city in Catalonia—by the Navarrese Corps 15 January. This completed what has been called the "preliminary" phase of the campaign, during

which the Insurgent Army captured the enemy's strongly fortified defensive zone, using the same well tried-out tactics of threatening in front of the fortifications, then outflanking and attacking them vigorously in flank and rear. After 15 January, the Insurgent advance became much more rapid, while the Government Army withdrew from one fortified position to another without risking a decisive battle. By the 22d of January, just one month since the start of the big push, the Insurgent corps were spread over Catalonia like a giant hand clenching into a fist around Barcelona. Its wrist was in the far north close to the French border, its knuckles at Manresa and Igualada and its fingertips along the coast.

It was expected that the Government Army would make a determined stand on the so-called "mystery line," which extends roughly from Berga to Manresa, thence along the Llobregat River. However, no exceptionally strong resistance was encountered along this line and on the 24th the Maestrago Corps captured strategic Manresa, 30 miles northwest of Barcelona, while on the same day the Navarrese troops captured Martorell, 12 miles west of Barcelona and the Moroccan Corps drove to within seven miles southwest of Barcelona, reaching Gava, the last ramparts of the Government's coastal defenses. It was evident that by this time the Government defense had collapsed.



CAPTURE OF BARCELONA, 26 JANUARY 1938

The final movement against Barcelona was carried out from two directions: west and north. On the west, Yague's Moroccan troops who had been waiting on the right bank of the Llobregat River, received their orders at dawn of the 26th. Three divisions pushed across the river, captured the hill of Montjuich which dominates the harbor area. The Navarrese Corps had scaled the slopes of Tibidabo heights (1,900 feet) overlooking the city from the northwest and pressing down its suburban slopes had entered the suburb of Gracia. The Legionnaire Corps advanced from the northwest. White flags and the Insurgent colors were observed all over the capitol and shortly after two o'clock in the afternoon the Insurgents made their triumphal entry into the city without having fired a shot, gaining the greatest prize of the war.

Three picked units which had seen some of the most savage fighting of the war—the Navarrese Army Corps, the Moroccan Legionnaires and an Italian blackshirt "arrow" division—were given the honor of leading the entry into Barcelona, receiving a tumultuous welcome from the half-starved population of 1,500,000.

The Government Army, now in disorderly retreat proceeded to the north; but Franco was not satisfied to rest on his victory. Accordingly, he immediately set his forces in pursuit of the enemy before it could organize new lines for the defense of northern Barcelona Province. The Navarrese and Legionnaire Corps moved upon Granollers, key to railroads and highways leading to the French border; the Moroccan Corps pushed rapidly along the seacoast, while the Aragon and Maestrago Corps advanced upon Berga and Vich, respectively. The retreat was now a complete rout and ended with the complete occupation of Catalonia by the Insurgent Army on 10 February.

There is a diversity of opinions as to the reasons why the Government Army defending Catalonia collapsed and why, even if forced out of its strong lines of defense, it did not make a determined stand outside Barcelona as was done outside Madrid. Military experts acquainted with the situation on both sides give two reasons: first, food; second, equipment. Lack of food weakened the army's resistance, while behind this hungry army was a still hungrier population. From the beginning of the war, Franco had over ninety per cent of the Spanish officers, regular troops and the Moroccans on his side, and this asset became even greater when he gained control of the sea. When the rich agricultural lands of western and southwestern Spain fell into his hands, Franco won his second great advantage. At the beginning of the war, Government Spain possessed superiority of equipment, but gradually lost it. Its officers, hastily improvised and trained, are no match for the Insurgent's well tested generals. In the Catalonia offensive, both armies were matched as far as manpower is concerned, but the Insurgent superiority in equipment varied at from five to one to eight to one. In this big drive, both armies were tired and exhausted, and superiority of guns, planes and leadership were the important factors that gave the Insurgents their overwhelming victory.

THE CITY OF BARCELONA

Barcelona, in the northeast corner of the Spanish Peninsula, is the capital of the autonomous state of Catalonia and had been the provisional capital of the Loyalist Government since October 1937. One of the chief trading ports of the Mediterranean since ancient Roman days, Barcelona was founded by Hannibal's father—Hamilcar Barca—in 200 B.C. The Barcino of the Romans, it became one of the empire's most important colonies and replaced Tarraco (Tarragona) in importance as a seaport. A fine harbor in a strategic corner of the Mediterranean, the port was conquered and reconquered in the course of the centuries. The Moslems conquered it in 713, renaming it Bardjaluna. After their expulsion from Spain, the city became the independent countship of Barcelona, an important focal point of trade, politics and intrigue during Europe's Dark Ages. It was also a center of culture. Cervantes lived and wrote there for several years. In the Napoleonic era, it was occupied by

the French; however it has never had any serious leanings toward union with France, although due to its geographical position it has had more associations with the south of France than with the rest of the Iberian peninsula.

Barcelona has had an almost continuously turbulent history. Always a thorn in the side of the Central Government of Spain, it has been the arena of social, industrial and labor conflicts, a hotbed of anarchy, the cradle of revolution. Always a capital of intrigue, Barcelona was one of the centers of the plotting which led to the overthrow of the Spanish monarchy in 1931. In 1929, the Spanish author, T. R. Ibarra, wrote an interesting comparison between the two Spanish cities—Seville and Barcelona—"the antipodes of Spain." He wrote: "Present-day Spain is a struggle between the Barcelona idea and the Seville idea. In Barcelona, the Catalonians insist that the former is bound to prevail; but go to Seville and you will find every Sevillian, every Andalusian from the surrounding countrysides, jeering at Barcelona and the Catalonians and insisting that Spain, as incarnated in the lovely city of the Guadalquivir, is the real article and, as such, destined to reign in langurous splendor long after upstart Barcelona has got her deserts. Barcelona is business; Seville leisure. Barcelona is Pittsburgh, Seville, the South Seas. Barcelona is speed and noise and adding machines; Seville is music and moonlight and sparkling eyes. Barcelona is fact; Seville is romance."

The loss of no other city or area could have been more ruinous to Government Spain because with the loss of Barcelona it has lost its main seaport, its industrial main-spring and its metropolis.

With the capture of Barcelona, Franco has a new set of railroad lines and steamer terminals that will greatly facilitate his attack on the battered Valencia port, without which Madrid would go into a siege. It may be that Franco will turn toward Madrid. The Government has been able to hold the old capital against all attacks since November 1936. The Insurgents reached the outskirts of Madrid, in the University City, but they have been unable to penetrate any farther. It is not believed that Franco will try a frontal attack on

Madrid. He may drive south from the Teruel salient and thus threaten Madrid and Valencia at the same time.

In considering future operations, the Government army seems incapable of any successful offensive action. During the fight for Catalonia, General Miaja launched an offensive against the southwestern corner, north of Cordova on 6 January, and another at Brunette to the southwest of Madrid. While at the start, these efforts had considerable success, they played no important role because they did not materially slow up the drive against Barcelona.

Government Spain now consists of nine provinces, embracing a population less than twice that of Insurgent Spain. The Republican area is entirely agricultural with the exception of some war industries operating in Madrid, Valencia, Alicante and Cartagena. Most of these, however, have been damaged by bombing and are in partial operation.

There is a possibility that the Government may be able to put up a long and bitter fight in Central Spain. However, it must be considered that the Central Area is equipped to turn out small arms and ammunitions only, and that in losing Barcelona, the Government forces have been deprived of their main munition factories. The Catalanian offensive took a tremendous toll of men and munitions and according to reports, ammunition had to be rationed to Government troops in the last engagements outside Barcelona. On the other hand, Franco's Army is composed of well trained and tested veterans, under expert leadership; they have ample food, guns and munitions and are assisted by an overwhelming air force. Under these circumstances, in spite of the bravery of the Spanish soldier, it is difficult to imagine a Government victory or even a stalemate.

After over two and a half years of war, Spain is utterly exhausted from the war, its horrors and sufferings. Odds are overwhelmingly in favor of Franco and, unless something unforeseen happens, it seems safe to predict that this civil war is nearing its conclusion and with the complete subjugation of Catalonia, an Insurgent victory has become not only probable but imminent.

"I feel sorry for Spain—sorrier than for myself. This war will mean decades of suffering and poverty for the great masses who have been duped into supporting the interests of a selfish few. My only hope is that it will end quickly so that what little remains of the Spain I love may be saved."

(Niceto Alcalá Zamora, First President of the Spanish Republic, now in exile.)

The Sino-Japanese War

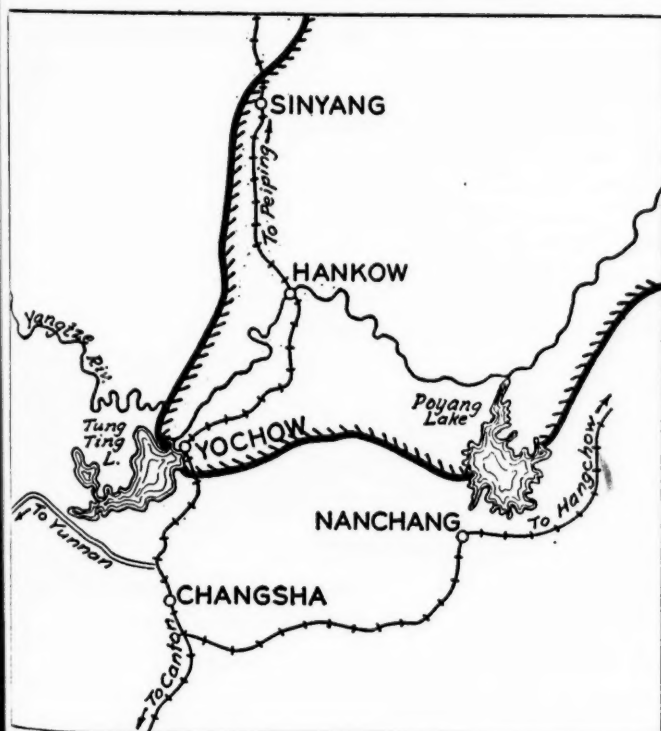


Pictures Inc.

JAPANESE INFANTRY ADVANCING BEHIND TANKS, SOUTH OF THE YANGTZE RIVER

Soon after the fall of Hankow on 26 October 1938, the Japanese launched their campaign in Hunan province and on 12 November captured Yochow, situated on the eastern shore of Tung Ting Lake—122 miles up the Yangtze from Hankow. Reinforcements were rushed and the Chinese

succeeded in reestablishing their defensive line, which now runs along the Sintsiang River (10 miles south of Yochow) to the western shore of Lake Poyang (north of Nanchang). Strong Chinese resistance has checked any further Japanese advance to the south.

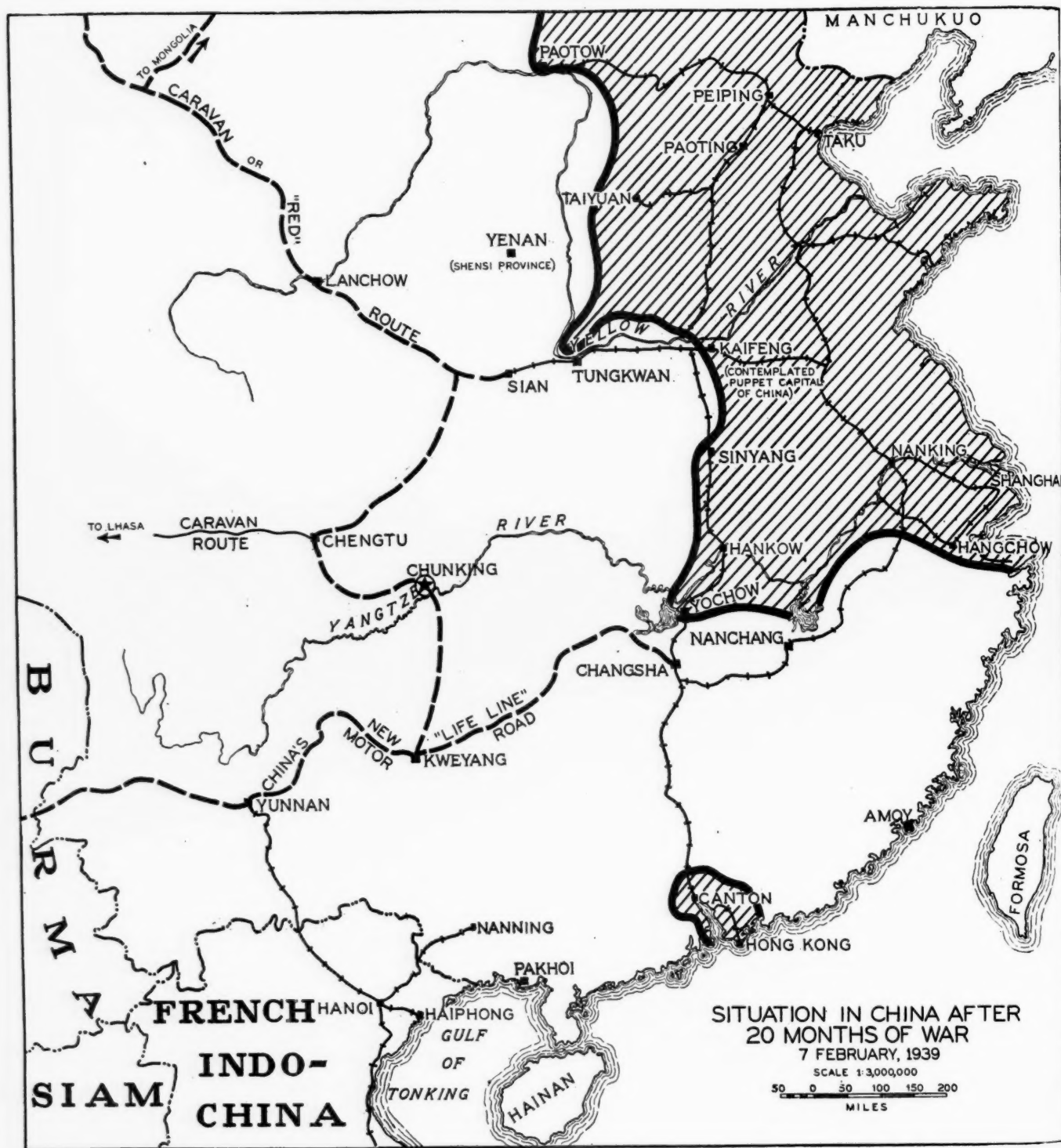


SITUATION HANKOW FRONT 15 FEB. 1939

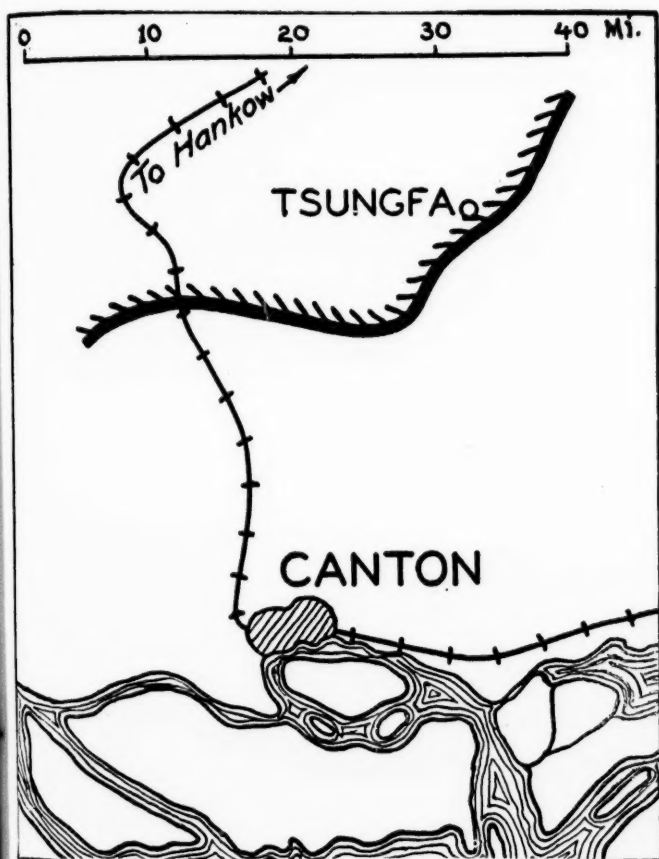
In South China, Japanese forces have been busy cleaning up the Canton-Bias Bay area, where a considerable number of Chinese forces had been left behind during the invader's dash to Canton. Japanese detachments have also undertaken the difficult task of mopping up the Pearl River delta. North of Canton, the Chinese are holding a line extending from Tsungfa almost due west astride the Canton-Hankow Railway.

No operations of importance have occurred in the last three months north of the Yellow River. The Japanese forces have been kept busy clearing conquered areas and trying to exterminate guerrilla operations. It is probable, however, that the Japanese will resume the offensive in North China with a view to capture Yen-an—the Red capital—and Sian, railway terminal of the Lunghai Railway and also terminal of the Caravan or "Red" Route. According to Japanese reports, Soviet arms and munitions are reaching China's armies in increasing amounts by the great overland highway from Siberia into China's northwest, through Sinkiang, Kansu and Shensi Provinces, where for over a year thousands of coolies have been working. Tungkwan, at the great bend of the Yellow River, has withstood for more than a year Japanese efforts to drive into the northwest and cut China's principal overland link with the Soviet Union. Northern Shensi is largely controlled by Chinese Communist forces.

The Sino-Japanese War



On 10 February 1939 the Japanese made a surprise landing on Hainan Island, off the coast of French Indo-China where an air base will be immediately established. It is very probable that the Japanese will also occupy Pakhoi, the



SITUATION SOUTHERN FRONT, 15 FEB. 1939

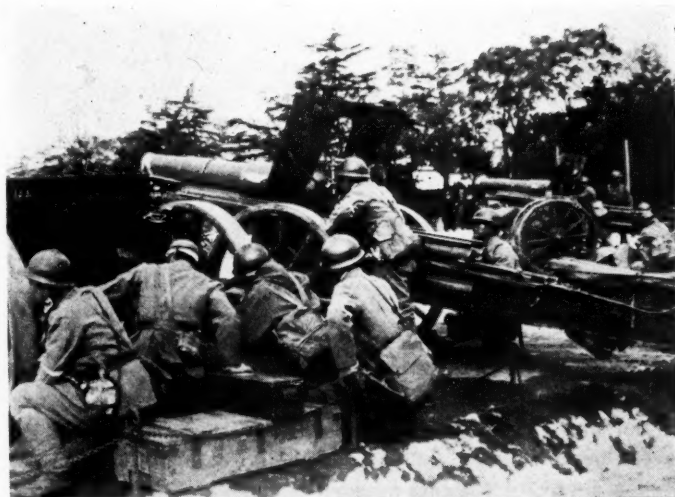
seaport on the Gulf of Tonking—70 miles from the Indo-China border—in order to cut off the importation of arms for China by way of French Indo-China. The occupation of Hainan Island parallels in audacity and surprise the sudden attack at Bias Bay, 11 October 1938 which resulted in the rapid occupation of Canton—China's southern metropolis—and the severing of the Hong Kong route which was the main supply artery of China's munitions.

Due to the shortage of equipment and war materials as a result of the loss of Canton and the tight Japanese blockade, the military high command of the Chinese government at Chungking has decided to expand the guerrilla activities of the armies fighting Japan, assigning one-third of the total of Chinese regular troops to guerrilla operations, which previously has been carried out largely by untrained and poorly equipped militia and partisan groups. In accordance with a plan evolved last January at a military conference at Changsha, another third of the present forces will be engaged in position warfare in the southwest and northwest, defending strategic lines which the Japanese are attempting to penetrate, and the last third will be kept in reserve as available replacements.

The main body of the Chinese Army is at present entrenched in the mountainous areas of the southwest and in the barren northwest, and the Japanese are seeking to pre-

vent the re-entry of these forces into what they call "occupied territory."

It had been assumed in Tokyo that, once Hankow had been captured and the principal route to the sea cut (the Canton-Kowloon RR), the Chinese armies would disintegrate, defeatism would become rampant and China's subjugation would be complete. The expected decisive victory, however, is yet to come. Since the capture of Yochow last November, all army efforts to link up the Japanese holdings in the Yangtze Valley with Canton, whether by rail through Changsha or by Nanchang, have been frustrated and invaded provinces are by no means conquered. It seems apparent, that large scale battles and maneuvers have ended, although the Japanese Army will undoubtedly push on until it captures Nanchang, Changsha and Yenyan in the rich Yangtze Valley, as well as the other operations outlined, the purpose of which is to deprive China from receiving military supplies from abroad.



Pictures Inc.

JAPANESE 150-MM HOWITZER BATTERY READY FOR ACTION

Tokyo has apparently come to realize, however, that its troops have overrun all the area that they can reasonably expect to control. The immediate aim now is to cordon off this conquered territory and proceed with the enormous task of pacification.

The real task facing Japan at present is not military. In the first place, she must persuade the Chinese to accept Japan's military superiority as an accomplished fact and "cooperate" with Japan in the exploitation of China's resources. In addition, Japan must secure the consent of interested foreign powers to the establishment of a "new order" in Eastern Asia and the destruction of treaties which Tokyo now deems obsolete. "A 'new order' has been created in the Far East," Foreign Minister Arita said, "one making possible the wholehearted cooperation of China, Japan and Manchukuo, and the western powers had better adjust themselves to this 'new order'."

The next step to accomplish Japan's aims is to unite all the various puppet governments that have been established in Shanghai, Peiping, Tientsin, Nanking and Canton, into one pro-Japanese government, headed by some Chinese figure capable of commanding the respect of the Chinese people.

This task has been assigned to General Kenji Doihara, the Lawrence of Manchuria, who several years ago persuaded the last Manchu Emperor to come out of his retirement in Tientsin and become puppet Emperor Kangteh of Manchuria. On 27 January the Domei (Japanese) news agency reported



Pictures Inc.

JAPANESE SOLDIERS HURLING HAND GRENADES AT CHINESE POSITIONS

that Marshal Wu Pei-fu, sixty-one year old Chinese soldier and poet, who had been living in retirement for the last ten years, had accepted a Japanese invitation to head a newly created Pacification Commission with headquarters in Kaifeng (Honan Province) in the Lunghai Railway area under Japanese occupation. Wu Pei-fu's acceptance, however, has been since denied.

No man in China's modern history has put a more effective stop to the expansion of Japan's influence in China than Wu Pei-fu did in 1920. As a northern division commander in charge of a garrison in far south Honan Province, Wu Pei-fu started early in the spring of 1920, with his subsequently famous 20th Division reinforced by some poorly armed Hunanese militia and before midsummer, had defeated the Japanese trained army and had become the champion of a strong anti-Japanese government. With a great deal of Japanese technical support, Chang Tso-lin moved against him from Manchuria in 1922, but was defeated, and during the next two years Wu Pei-fu came near being the master of all China. He was one of the most powerful war lords of China during the militaristic era from 1912 to 1927, but in 1928 he was crushed by Chiang Kai-shek and forced to go into retirement. For several years he has been living in Peiping, enjoying the respect and confidence of the Chinese people. This probably explains why the Japanese are exerting so much pressure and are so eager to get Wu Pei-fu into their service. So far he has refused to do so, and no other suitable puppet ruler has been found.

The strain of prolonged hostilities is causing difficulties on both sides. Changes announced from both Chungking and Tokyo have been made with a view to give increased authority to those elements in both countries which are determined to push the war to a decisive conclusion.

On China's side:

On or about 20 December 1938, Former Premier Wang Ching-wei, deputy leader of the Kuomintang (Nationalist Government Party), left Chungking for Hanoi in French Indo-China. On 30 December he sent a telegram from Hanoi to Chiang Kai-shek declaring that Premier Konoye's peace terms of 22 December offered a fair basis for peace discussions. Wang supported Japan's demands that China join the "anti-comintern" bloc and accept the occupation of North China, Inner Mongolia and Manchuria by Japanese troops, but on condition that such troops be withdrawn from the rest of China. The reply to this move was made at Chungking on 1 January 1939 when a special session of the Kuomintang's standing committee expelled Wang from the party and dismissed him from all official positions for "deserting his post and suing for peace in contradiction to national policy." This was the latest of several breaks between the two favorite disciples of Dr. Sun Yat-sen, the founder of the Chinese Republic.

On Japan's side:

On 4 January 1939, Emperor Hirohito commanded Baron Kiichiro Hiranuma to form a new Cabinet. Prince Konoye, whose nineteen-month tenure of office started a month before the outbreak of the undeclared war with China, resigned stating that it was "urgently necessary to enhance the confidence of the nation by formulating policies under a new Cabinet." The Konoye Cabinet fell before strong Militarist-Nationalist reorganization demands, at home and abroad, for renewed efforts to fasten Japan's will on East Asia. Among their demands were more rigid control of economic life in Japan, new policies to secure Japan's conquests in China and a single political party.

The new Japanese Cabinet is constituted as follows:

PREMIER—Baron Kiichiro Hiranuma
 MINISTER WITHOUT PORTFOLIO—Prince Fumimaro Konoye (also President of the Privy Council)
 FOREIGN—Hachiro Arita
 WAR—Lieut. General Seishiro Itagaki
 NAVY—Admiral Mitsumasa Yonai
 FINANCE—Sotaro Ishiwatari
 EDUCATION—General Baron Sadao Araki
 WELFARE—Hisatada Hirose
 COMMERCE AND OVERSEAS—Yoshiaki Hatta
 AGRICULTURE—Yukio Sakaue
 RAILWAYS—Yonezo Maeda
 COMMUNICATIONS AND JUSTICE—Suehiko Shiono

The new Premier—head of the Japanese government—was born the son of a feudal lord in 1863, three years before the restoration of Emperor Meiji. At the age of twenty-three, he graduated from the Law College of Tokyo Imperial University and launched a legal career that led to his appointment as President of the Supreme Court and to a cabinet post in the Yamamoto Cabinet, which followed the great earthquake of 1923. He is today one of Japan's outstanding Nationalists and in his first radio address 6 January 1939, he proclaimed that "his cabinet will follow unflinchingly this path of empire without deviation to accomplish the nation's aims."

On 2 January 1939, Lieutenant General Otozo Yamada, fifty-seven year old former commander of the Japanese 12th Division, was appointed to succeed General Shunroku Hata as commander of the Japanese forces in China. This change of command is considered by many foreign observers as foreshadowing a definite change in Japanese tactics in China, tending to indicate that major military operations have been completed and that the campaign henceforth would be directed at wiping out guerrilla fighters and pacifying partly conquered regions. Admiral Koshiro Oikawa, commander of Japan's Third Fleet in Chinese waters, became ranking Japanese officer in Central China. Thus it seems that hereafter the navy will dominate the picture, maintaining control of China's seaports and the main avenues of inland commerce—the Yangtze and Pearl Rivers—while scattered army columns try to mop up guerrilla resistance.

Japan's military campaigns have been successful, she holds the cities of Peiping and Tientsin, all ports on the coast, Nanking and Hankow on the Yangtze River, the Peiping-Hankow Railway and the Canton-Hankow Railway—in part—although it is also true that within these areas Chinese move freely, traverse the countryside, cross Japanese lines of communications and harass Japanese patrols.



Pictures Inc.

CHINESE FORCES IN DEFENSIVE POSITIONS

China has been reduced to defense and must resort to guerrilla tactics, for she lacks the equipment on land or in the air to meet the invader's mechanized units face to face. She can no longer conduct position warfare. In addition, China is handicapped by lack of munitions. Germany, according to reports, formerly supplied as high as 67 per cent of military equipment and munitions; but all sales were terminated when Germany reached an understanding with Japan, at which time General von Falkenhausen and forty other German officers who had been acting as military advisors and assisting in training the Chinese Army, were recalled by the German government.

It is true that the Japanese armies have pressed deeper and deeper into China, spreading over an ever increasing area and gaining brilliant successes; yet they have been unable to achieve a decisive victory and annihilate an elusive foe who possesses inexhaustible reserves of manpower.

Guerrillas in ever increasing numbers are causing considerable disruption and creating very serious difficulties.

The cost to Japan of this type of warfare is enormous. The budget for 1938-1939 was 238 per cent more than the expenditures of the last year of peace and, according to estimates, amounted to more than 40 per cent of the national income. The coming fiscal year appropriations for the Chinese war alone will be greater by more than a fifth than the total regular budget, including appropriations for the Japanese army and navy, although this budget is the greatest in the empire's history. Until now, the Japanese government has encountered little difficulty in floating its loans on the domestic market, but there is a limit to this system of financing and, if continued for a certain length of time, Japan's financial position may become intolerable.

The magnitude of the Chinese resistance may be measured, when it is considered that Japan has had to mobilize 1,000,000 men; casualties are estimated at from 300,000 to 450,000; far reaching industrial mobilization laws at home have had to be invoked, and her national income has been mortgaged for a generation.

The future aims and policies of the two combatants may be summarized as follows:

China:

China's main aims in the months and years to come will be threefold:

1. To maintain national morale, which up to now, has held up so well.
2. To exploit and build up the potential resources, agriculture and resources of the hinterland until what is left of China is independent of the coastal provinces.
3. To obstruct by all means all Japanese economic projects in China.

The Chinese National Government expects to accomplish these ends by a campaign of political education, particularly propaganda in the areas within the invaded zones but not yet controlled by the Japanese, and upon guerrilla warfare.

Japan:

Japanese non-military activities in the next few years will have the following objectives:

1. Establishment and maintenance of a puppet regime, dominated by the Japanese.
2. Industrial and agricultural rehabilitation, through the creation of powerful Chinese groups opposed to a continuation of the present war and anxious to come to terms with Japan.
3. Extensive exploitation of China's natural resources in order to secure at least a partial compensation for Japan's tremendous war expenditures.
4. Complete or partial exclusion of foreign interests in China in order to preserve China's vast market for Japanese commodities.

CONCLUSION

The twentieth month finds this war transformed from a conflict of swift smashing movements into a less spectac-

ular war of attrition, the type of struggle by means of which Chiang Kai-shek hopes eventually to exhaust Japan and obtain ultimate victory for China. In brief, Japan is committed to a program of conquering China and it appears at present that no leader in Japan could come to terms with China on less than the basis already announced by Prime Minister Konoye last December and lead the Japanese Army with him. Similarly, according to press reports, Ambassador Nelson T. Johnson, who has just returned from China, said upon his arrival in the United States that he is convinced

that the Chinese will continue to fight indefinitely and the war will go on, perhaps for years.

The type of warfare that China is waging is a real drain on Japan and according to observers it is expected to go on for a longer time than anyone can predict. Operations in China cannot be limited; as the Japanese move forward they are inexorably drawn further in. The predicament of the Japanese Army can be appropriately summarized by the old oriental proverb: "He who rides a tiger finds it difficult to dismount."

It's a race against time. It's a case of which side can hold out longer: China with high morale but no heavy guns, or Japan with all the mechanical equipment of a modern army, but an army that is costing between two and three million dollars "gold" a day.

—Dr. W. S. A. Pott, *President of Elmyra College**

*Dr. Pott has lived for years in China and is well acquainted with the country and its people.

Foreign Military Digests

Digests of important articles from foreign military periodicals; the remaining articles for each magazine are listed in Catalog of Selected Periodical Articles.

JAPANESE BOMBARDMENT AVIATION

[Condensed from article by Captain A. Alimow, in *Viestnik Vozdushnovo Floto* (Russia), April 1938. Translation by Historical Section, Army War College, Washington, D.C.]

BY MAJOR E. M. BENITEZ, *Coast Artillery Corps*

At the outset of the war in China the Japanese air service comprised 18 aviation regiments with a total of 1,300 planes. These included approximately 400 bombers, 700 pursuit planes, and 200 reconnaissance planes. Thus, 30 per cent of the Japanese aircraft were bombers. It is well known that in all of the large air fleets of the World Powers, bombardment aviation comprises between 50 and 60 per cent of the total planes in active service. The deficiency of the Japanese bombardment aviation may be explained by the fact that Japan was late in developing her own aviation industry for the production of large-size planes.

Prior to 1933 Japan produced only light single-motored planes. Heavy bombing craft of the Japanese air service had been imported from Germany and consisted of the 4-motored Junkers "G-38" planes. In 1933 the Japanese began manufacturing single and twin-motor all metal bombers of the "93" type. These planes are still employed in the Japanese army. The characteristic features of these craft are as follows:

The light "LB 93" bomber, single-motor, biplane: powered by a water-cooled "BMV-9" engine of 700 h.p.; it has a maximum speed of 140 mi. per hour; carries a 1200 lb-load of bombs and fuel for six hours of flight; ceiling, 15,600 feet; its armament consists of 3 machine guns.

The light "LB 93" bomber, twin-motor, is a monoplane; its two motors are air cooled, of the "Jupiter" type, of 550 h.p. each; has a maximum speed of 150 mi. per hour; carries a 1200 lb-load of bombs; fuel reserve sufficient for 5 or 6 hours flight; ceiling, 18,000 feet; armament, 5 machine guns.

The heavy bomber "TB 93" type is a monoplane; powered with two motors, water-cooled, "BMV-9" type of 700 h.p.; maximum speed 140 mi. per hour; carries a 2200 lb-load of bombs; fuel for 8 to 10 hours flight; ceiling, 18,000 feet; armament, 5 machine guns.

Since the beginning of the war, the Japanese have started using a new type of swift bomber with retractable landing gear; from the photographs of this new plane which have appeared in the Japanese press it may be assumed to have a speed of 180 mi. per hour.

The planes of the "LB 93" and "TB 93" type have been modernized; landing gears have been made semi-retractable; additional machine guns have been mounted below the fuse-

lage capable of firing to the rear and downward. As a result of these improvements, the planes of the "LB 93" and "TB 93" type have acquired an additional speed of 12 to 18 miles per hour and also greater fire power.

All Japanese bombers are equipped with bomb racks and electric bomb releases. In order to allow the handling of different size bombs on their planes, the Japanese have arranged their bomb racks so that these could be attached to releases under the wings or under the fuselage of the plane. Thus they have racks holding 10 small bombs; racks holding 3 medium bombs (50 to 100 lbs.) and racks for 2 large bombs (220 to 550 lbs.). This arrangement enables them to quickly effect changes in the particular load of bombs in accordance with the proposed bombardment objective.

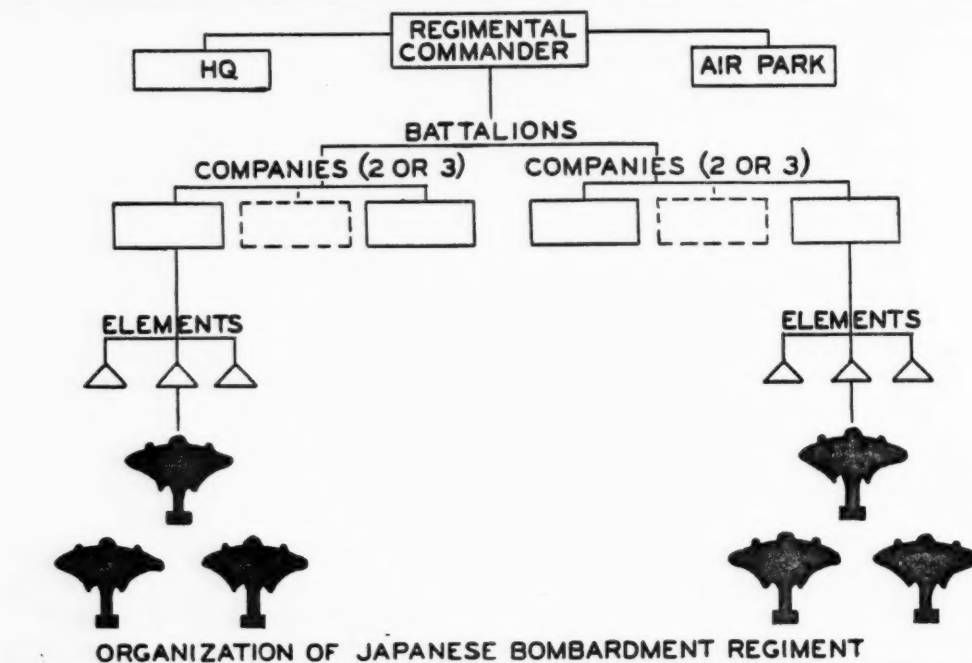
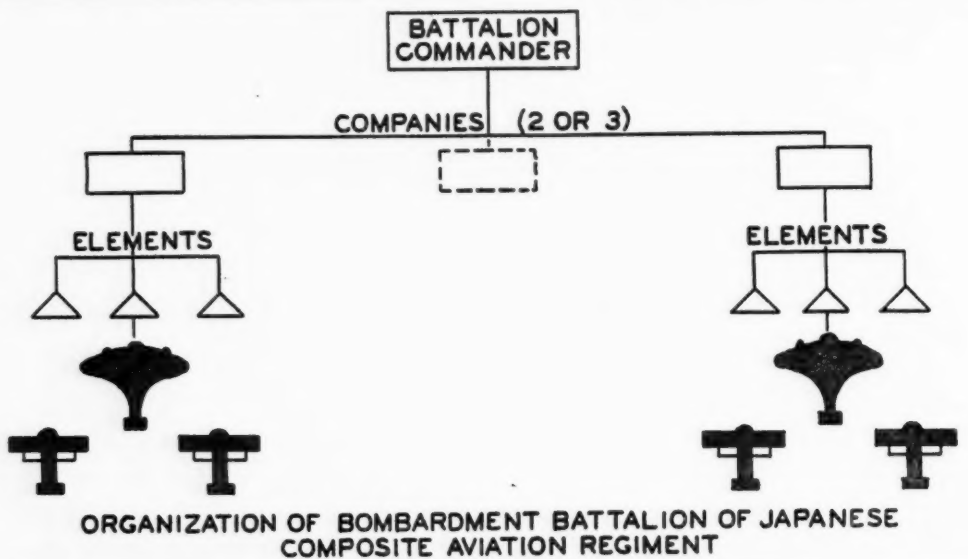
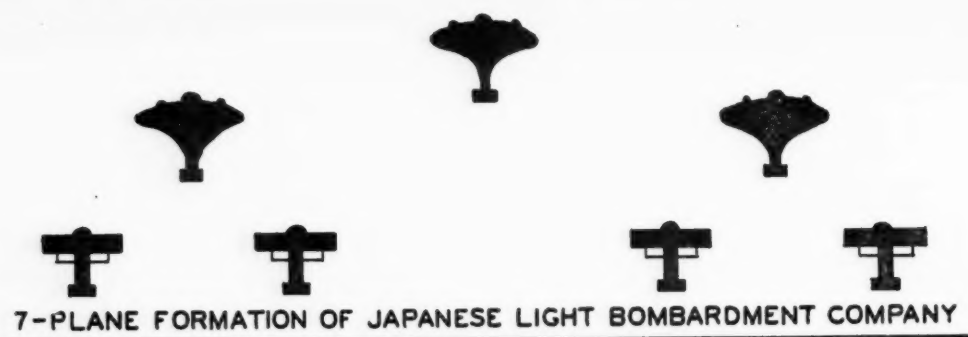
All twin-motor bombers are equipped with the Grez firing device of Japanese manufacture. The navigation equipment of the Japanese twin-motor bombers, include radio direction finders in addition to the usual instruments.

The bombers carry twin-machine guns of the "89" type (7.7-mm. cal.) mounted in turrets. Two large half-disks holding 90 rounds of ammunition each, serve as the magazine of the weapons. The machine guns fire at a rate of 600 rounds per minute (1,200 rounds for the two machine guns); the mount of the two weapons, with disk, has a weight of 55 lbs. The single-motored bombers of the "LB 93" type have machine gun arrangements permitting them to fire through the propeller (one per plane), using Vickers and "89" type (Vickers of Japanese manufacture), 7.7-mm. cal., with a rate of fire of about 1,000 rounds per minute (with the aid of accelerator device).

In China, the Japanese commenced using large-caliber machine guns of the Colt type (caliber 12.7-mm.) of American manufacture, and the twin-motor bombers are usually equipped with a machine gun of this caliber.

The Japanese bombardment aviation uses the following bombs in China: incendiary (small caliber), fragmentation (22 to 110 lbs.) and high explosive bombs weighing from 110 to 1,100 lbs.

As a rule, the twin-motor bombers are operated by officer-flyers or by noncommissioned officers of the permanent establishment, with a co-pilot from among the soldier-flyers. With few exceptions, the actual bombing and navigation are carried out by the commander of the crew personally. Japanese bombardment aviation does not include any officer-observers (these are to be found only in the reconnaissance regiments); hence the commanders of elements, companies, battalions, and even regiments, personally lead their units and perform the functions of navigator and gunner. In numerous instances the twin-motor planes carry staff offi-



LEGEND:

TB-93 PLANES

LB-93 PLANES

SINGLE-MOTOR LB-93 PLANES

cers and senior air technicians of aviation companies (officers) as pilots. Aviation motor mechanics and enlisted gunners who have completed special courses of instruction (3 months) at regimental air parks act as gunners.

Communication is handled by specially trained radio operators. The crew of the twin-motor bomber consists of from 5 to 7 persons.

ORGANIZATION

The Japanese bombardment aircraft are either organized into independent regiments or are incorporated into composite aviation regiments.

The independent bombardment regiments comprise the heavy bombardment aircraft and are equipped with the "TBZ" planes. The composite regiments include light bombardment units (battalions, ordinarily) of the single-motor and twin-motor planes of the "LB-93" type.

The basic tactical unit of the Japanese bombardment aviation is the company of 9 planes. The company of light bombers includes three twin-motored planes (for the element commanders) and six single-motor planes.

The battalion of two or three companies is organized as a unit capable of independent operation. It is usually assigned a separate airdrome.

The regiment constitutes the highest tactical organization, possessing all the services necessary for the training, combat, supply and technical functions of the regiment.

DISTRIBUTION OF PLANES AT AIRDROMES

Japanese air service regulations prescribe the assignment of airdromes to battalions and even to companies of bombers. Thus the regiment should occupy an airdrome system with a minimum of two or three airdromes, and a reserve flying field. However, the war in China has shown by actual experience that the Japanese have a tendency to maintain their aircraft in concentrated formations at large airdromes. Press reports have indicated the presence of as many as 100 Japanese planes at one time on some of their airdromes in China. This serves to facilitate control and maintenance of the aircraft; on the other hand, such a distribution may bring serious consequences in case of a surprise attack by hostile aircraft.

FLIGHT FORMATIONS

The Japanese bombers use the generally accepted "V" formation, phalanx, and, more rarely, the flight in column by small groups (up to a company). Their more acceptable flight formation in the case of groups of several companies is the flight in column, with companies in "V" formation (each company being divided into "V" formations by elements of three planes).

A special feature in the formation of the light bombers is the mixed composition of their elements (of three planes): the leader of the element—an officer—uses a twin-motor plane, while the other two planes of the element (flown by noncommissioned officers or privates) are single-motor planes. In the event that two of the company's nine planes are disabled, the company then takes up a 7-plane formation.

AERIAL COMBAT

In defensive aerial combat the Japanese bombers maintain close formation, observing the principle of mutual fire support, which is expressed by the following rule of the Japanese Air Service Regulations as follows: "*Fire not against he who happens to attack you, but on those against whom your comrade is unable to fire.*" In order to be able to fire with all the guns carried on the planes, the Japanese groups of planes reform during aerial combat in order to use the turret machine guns to better advantage. Reorganization on the part of the elements is brought about by moving the two rear planes to positions above and below the leader.

As a rule, the Japanese bombardment company, when engaged in defensive combat, does not maneuver in direction or make turns and twists that may cause the separation of individual planes and involve their certain destruction by hostile pursuit craft. In other words, the defense of the company is formed with the object of maintaining the flight, mutual support and maneuver of the planes within the flight formation. Mutual fire support among companies is regarded to have slight effectiveness in view of the considerable distances separating them, and the Japanese favor fire at close range in aerial combat (at from 50 to 200 yards) for all types of aircraft.

The movement of elements within the company formation until the time when the formation is changed from the "V" formation to the flight in column, is carried out quickly by the Japanese bombers, in accordance with the requirements of the combat situation, at the will of the element commanders. Thus, in the event of an attack upon them by hostile pursuit craft from the left, from above or from the rear, the Japanese bombardment company which has been flying in diagonal formation apexed to the left, reforms into diagonal formation apexed to the right, or it adopts the following formation: the leading element maintains its "V" formation, but the left plane in rear assumes a position below the leader of the company; the second element assumes a position on the right and above the leading element, adopting a formation similar to that assumed by it; the third element assumes a position on the left and below the leading element, turning somewhat toward it and assuming a position similar to that of the other elements. This change of formation enables the company to open fire against the attacking pursuit craft on the left with all available turret machine guns, that are located on top of the fuselage behind the seat of the pilots.

Only a simultaneous attack by pursuit craft from two or three directions may cause the fire of the Japanese bombardment company to diverge, weaken it, and complicate or make entirely impossible the movement of elements in their formation. A feint attack by pursuit craft from one direction with a simultaneous delivery of the main attack from another direction may also produce positive results in aerial combat with the close formation of the Japanese bombers.

Reconnaissance for the purpose of locating bombardment objectives, is undertaken in conjunction with bombardment raids. In the event that the enemy does not have any pursuit force at the bombardment objective, the bombardment craft, after dropping its bombs, return by elements, flying over a wide area and "combing" the entire zone from the objective of their bombardment up to the front lines. The leading planes of the elements carry photographic equip-

ment, and photograph the objectives of interest while on their way—at the same time observing these objectives from the air. In case that the bombers, protected by friendly pursuit, are attacked at their objectives by hostile pursuit craft, the return flight is also made in several groups.

During the operations in China the return of Japanese bombardment craft after the execution of bombing raids has been observed to be in groups flying in different directions, the groups being made up of two bombardment and one pursuit elements. Apparently this disposition on the return flight is undertaken in the interest of reconnaissance.

Instances of individual flights reconnoitering for bombardment objectives 40 to 60 miles in rear of the enemy lines are rare exceptions. These missions are undertaken with swift pursuit craft (up to a distance of 250 miles behind the front). In the execution of raids against troops, the bombardment craft utilizes the data of reconnaissance aviation.

Flights for the reconnaissance of airdromes without bombing the airdromes at the same time are not undertaken by the Japanese. Night reconnaissance has not been carried out to any extent in China.

BOMBARDMENT OPERATIONS

Japanese bombardment aviation operates under conditions where enemy aircraft (Chinese) is considerably weaker, i.e., when control of the air and an overwhelming superiority is on the side of the Japanese. This circumstance, naturally, gives a special aspect to the nature of the combat functions of Japanese bombardment aviation, which are not always in accordance with Japanese Field Service Regulations in existence before the war with China.

OPERATIONS IN CHINA

The tactics of Japanese bombardment aviation will be further discussed based upon the tactics employed by them in China. Japanese bombardment aircraft performs the following basic missions:

1. Bombardment of hostile airdromes;
2. Operations against railways and transport vessels;
3. Bombardment of ground forces on the battlefield and behind the lines;
4. Bombardment of large industrial and political centers.

1. *Bombardment of hostile airdromes.*—In accordance with the Japanese Air Service Regulations, the primary mission of aircraft is the destruction of the hostile air forces at their airdromes. At the beginning of the war (July 1937) the center of operations was in North China. The Chinese had no aviation there, and due to this fact Japanese bombardment aviation was employed to attack ground forces and peaceful inhabitants.

The Japanese operations on the Shanghai front were preceded by active Japanese aerial operations against Chinese airdromes in the Shanghai—Nanking—Hangchow area, where the bulk of the Chinese air force had been concentrated. During the period 13-31 August 1937 Japanese bombardment aviation made about 250 air raids on Chinese airdromes. The Chinese air forces did not suffer any great losses in military planes as a result of these raids; however

due to the fact that the Chinese lacked aircraft factories to make up for losses, Chinese aviation manifested little activity from the middle of September to December 1937 as a result of these raids.

During the first phase of the operations against airdromes (August 1937) Japanese bombers raided Chinese airdromes without the protection of pursuit craft, at low altitudes (180 to 350 feet) and in small groups; as a result, they suffered heavy losses inflicted upon them by anti-aircraft fire and Chinese pursuit. During this period the Japanese bombers demolished airdrome structures at Hanchow, Nanking, and Shanghai, they destroyed about 50 Chinese planes (mainly training planes at school airdromes). The Chinese aircraft proved quite efficient in changing airdromes, and in slipping away from under the assaults of the Japanese bombardment craft.

The second phase of important bombardment operations by the Japanese against Chinese airdromes began in December 1937 when a considerable strengthening of Chinese aircraft became apparent (with planes purchased abroad); the Chinese air service began putting up strong resistance against Japanese air raids, and, later on, assumed active operations against Japanese airdromes.

As a rule, the Japanese bombardment craft undertake flights up to 250 miles from the front, escorted by pursuit, often meeting this escort along the route of flight at some distance from their objective. Raids on airdromes are carried out by large groups (of 30 to 40 planes) and seldom by less than one company (nine planes).

The accompanying pursuit planes (15 to 30) fly by elements echeloned in two or three altitudes,—above, in rear, on the right and left of the combat formation of the bombardment craft at a distance from them of about 1000 to 2200 yards.

The Japanese bombers usually approach the hostile airdrome at an altitude of from 6000 to 13,000 feet, from the direction of the sun, in column of nine-plane flight formations—when the raid is made with a large group of planes,—or in wedge-shaped formation of nine planes by element, (when the raid is made by a single aviation company).

Where the bombers meet Chinese pursuit craft, the bombardment is carried out directly from the flight in the same formation in which the approach to the objective has been made, except that the planes close in more, forming an almost "parade" formation. Where there is no hostile pursuit, the bombers make one free flight over the airdromes to examine their targets and sometimes even for the purpose of dropping trial bombs; then the various elements separate and drop their bombs with each separate element (or company in case a large number of planes) attacking its own target.

Where no hostile pursuit craft is present the larger groups of Japanese bombers remain over their objective anywhere up to 30 minutes. There have been instances when their accompanying pursuit craft has departed and the bombers still continued to remain over their objective.

The bombs are dropped by planes while flying horizontally in column of flight behind the leader. Bombardment objectives include the following: First—hostile planes at their airdromes. When there are no planes at the hostile airdrome, the bombs are dropped on hangers and other air-

field buildings, or along the edge of the airfield if there is natural cover where hostile planes might be concealed. Departure from the objective is effected by turning in the direction of the home base at full speed, by separate groups, over different routes (when no hostile pursuit craft is present), in order to carry out reconnaissance missions on the return flight. There have been some instances when planes have taken refuge behind clouds immediately upon execution of their missions.

In bombing hostile planes at their airdrome the Japanese bombers employ small incendiary and fragmentation bombs (20 to 100 lbs.); in action against Chinese flying field and airfield structures they use high explosive bombs of 110 to 450 lbs.

The experience of the Japanese raids on Chinese airdromes has shown the poor effectiveness of bombings upon airfields. It is most difficult to tear up a field with bombs to the extent that it cannot be used by hostile craft. There have been cases where as many as 40 Japanese bombers simultaneously have dropped over 200 bombs on a single airdrome, and in spite of this, the Chinese planes still have continued to operate from this airdrome, finding undamaged parts of the field for the take-off and landing of planes.

In the preparations for and execution of air raids by the Japanese bombers against airdromes the following characteristics have been noted:

a. The major portion of the raids are delivered in daytime, from 11:00 A.M. to 2:00 P.M.;

b. The bombardment of airdromes is carried out systematically and persistently until they have been abandoned by the Chinese and until all airfield buildings have been destroyed (in numerous instances the Japanese have made about 20 raids on a single Chinese airdrome).

c. Airdromes to be bombarded are selected in advance and the bombardment is then carried out by separate groups raiding designated airdromes, regardless as to whether or not there are any Chinese planes present. There have been some instances where Japanese bombers passed over some airdromes where there was Chinese craft, and continued their flight in order to bombard other airdromes from which the Chinese planes had been removed.

The Japanese undertook some bombardment missions at night in the summer of 1937; these, however, proved so ineffective that the Japanese abandoned night raids.

In spite of the frequent massed attacks of the Japanese bombardment aviation against Chinese airdromes, it should be noted that the latter has not yet suffered particularly heavy losses from these raids, because timely information by the warning service has given them enough time to remove their craft.

2. *Aerial operations against railways* have been carried on most extensively in South China, where the Japanese bombardment aviation has been given the mission of halting rail movements over the Canton-Hankow and Canton-Kowloon railways.

This mission has been carried out by Japanese bombers in the following manner: Repeated raids are made for two or three days (four or five times daily) over a large section of the railway (200 to 400 miles) with all available forces. Proceeding to the raid simultaneously with a large group of bombers (30 to 80 planes) the planes split up into elements.

Each element bombards two or three railway sections or a like number of small railway stations, dropping bombs from low altitudes, at times from power-dives, one or two bombs at a time from each plane on a single target; they then proceed to their second and third targets. On the railway they destroy the rail-bed and moving trains. At railway stations the targets consist of trains that are stopping there and only part of the station buildings. This is due to the effort of the Japanese to halt the movement of foreign military supplies from South to Central China. This system of repeated, concentrated raids on definite railway sections, has often interrupted railway transportation for as long as twenty-four hours; but, as a rule, repairs are quickly made and traffic resumed within from 6 to 8 hours.

Complete interruption in traffic can be caused by the destruction of large railway bridges, but Japanese aircraft has very seldom succeeded in destroying railway bridges in China.

The bombardment of large railway centers has failed to interrupt railway traffic; it has, however, caused much damage, by starting fires which have destroyed much rolling stock.

Operation of Japanese bombardment aviation against transport vessels has been carried out without much interference on the part of the meager Chinese naval craft, and has proved to be very effective. Japanese bombers have attacked defenseless Chinese transports, releasing their bombs while power-diving from an altitude of from 1900 to 2500 feet. A particularly large number of Chinese river boats have been sunk.

3. *Bombardment of ground forces on the battlefield and behind the lines* has been carried out by the Japanese aviation very intensively whenever not otherwise engaged in combat with hostile aircraft. As a rule, the light bombardment craft (single-motor planes especially) operates entirely for the benefit of the ground forces and in close cooperation with them. Heavy bombers are seldom utilized on the battlefield, except for the bombardment of large reserve concentrations and in the pursuit of large hostile forces (at the crossings of wide rivers, while troops are entraining at railway stations, and similar places).

The bombardment of small troop objectives (batteries, small columns, separate trenches) is effected from power-dives by small groups of planes (elements) and by single planes, and it is followed by machine-gun fire against these objectives. In action against troops the Japanese employ small fragmentation bombs (20 lbs.), each bombing plane carries from 30 to 40 such bombs.

In the technique of their air raids against ground forces, it has been noted that attacks are never made at low altitudes. Even the Japanese single-motor bombardment craft seldom fly lower than at from 200 to 450 feet from the ground.

Japanese bombardment craft are frequently utilized where there is lack of artillery for the neutralization or destruction of Chinese fortified positions.

It should be noted that in operations against ground forces Japanese bombers execute frequent flights and carry on intensive activity while maintaining close contact with their own forces in battle, coming to their aid with their bombs and machine guns at those places where the ground

forces encounter strong enemy resistance. The Chinese army is poorly equipped with antiaircraft weapons; consequently the Chinese forces are unable to inflict much damage to Japanese bombers during operations on the battlefield.

4. *Action against large industrial and political centers in China* has been conducted by the Japanese bombers on an extensive scale since the beginning of the war. Objectives of their raids have been universities (considered centers of Chinese anti-Japanese movements), thickly populated Chinese sections of towns, hospitals, and government buildings.

The larger Chinese cities: Shanghai, Canton and Nanking, have been subjected to relentless bombardment. Chinese quarters in Shanghai and Chapei were thoroughly destroyed and burned by Japanese aircraft and artillery. The city of Canton has been the object of ceaseless bombardment by Japanese bombing craft.

In raids on cities, the Japanese employ a great variety of air bombs, preferring, however, incendiary bombs when operating against Chinese quarters, the buildings of which are overcrowded and made of wood.

In operations against sections of cities of European type construction the Japanese bombers employ bombs of large size (550 lbs.), which possess great power of destruction.

Japanese bombers in raids on defenseless cities have felt little constraint in the selection of targets, and their tactics in these instances, therefore, have been very simple, amounting to the release of bombs with as little loss of time as possible, and the quick, safe return to their base. During the first phases of the war, raids were delivered at low altitude with "parade" demonstrations over the defenseless Chinese cities, but later, when the Chinese aircraft and antiaircraft artillery began inflicting heavy losses on the Japanese bombers, they raised their altitudes to from 10,000 to 12,000 feet and now deliver their raids with powerful aviation groups under the protection of their own pursuit craft.

The savage bombardment of peaceful citizens and cities that have no military importance, have been made in an effort to secure an important political objective, namely: to force the Chinese government to capitulate, to compel it to accept the "peaceful" conditions of the Japanese—which would practically amount to a liquidation of Chinese independence. However, in spite of all sacrifices, the Chinese people seem to be resolved to carry on the struggle against the Japanese until the invader has been completely routed and driven from Chinese territory.

are closely dependent upon the geography of the theaters of operation and the organization of the air forces. The technical organization, operations and comparative efficiency of the opposite air forces in this struggle deserves serious study.



HENSCHEL HS. 123 DIVE BOMBER—GERMAN

1. **THE OPPOSING AIR FORCES.**—*a. The Insurgents. Personnel.*—The Insurgents have a superiority in numbers. It is difficult to arrive at exact figures, but an accurate estimate gave them from 500 to 600 first-line aircraft at the end of December 1937, and this number has been considerably increased since that date, while Government forces on the other hand have received no effective reinforcements. The Insurgent air force is predominantly Italian and German. It operates in complete tactical units of these nationalities, from the Chiefs of the Air Force down through the General Staffs, tactical units and the services. Furthermore, they are frequently assigned their own theater of operations. For example, the operations against Bilbao were conducted exclusively by German aviation; the operations against Santander were carried out by the Italians. According to Government authority, German bombardment is highly efficient. They operate in large formations, composed of well trained elements and maintain a high degree of discipline at all times. The author has twice witnessed Nationalist bombing raids; once on the coast between Barcelona and Tarragona and once at Tarancon, to the southeast of Madrid, at about 60 miles from the front. In both cases, attacks were carried out at altitudes of about 1000 feet without haste, a number of runs being made over the objective, bombs being dropped at each passage and finally the results being photographed. The actual assault was executed from close formation. At Tarancón a group of 8 Junkers and 6 Heinkels took a total of 25 minutes to complete their attack.

German pursuit pilots are inferior to both Italian and the Spanish Loyalist aviators in airmanship and in aggressiveness.

The Italians carry out bombardment missions at greater altitudes than do the Germans and with much less accuracy. They are invariably preceded by strong pursuit aviation; and do not execute bombardment missions except under favorable conditions, particularly as regards surprise.

b. Matériel.—The equipment is modern—consisting of the latest types existing in the German and Italian Air Forces. In addition to complete tactical units, the Germans also have provisional units for the purpose of conducting service tests on new equipment. At the beginning of the summer of 1937, this force consisted of a few small squadrons, equipped with the Messerschmitt-109 and the Dornier-

TACTICS AND TECHNIQUE OF THE AIR FORCES IN THE SPANISH CIVIL WAR

[*"La guerre d'Espagne. Technique et tactique des forces de l'air,"* by General Armengaud. Condensed from *Revue Militaire Générale*, April 1938.]

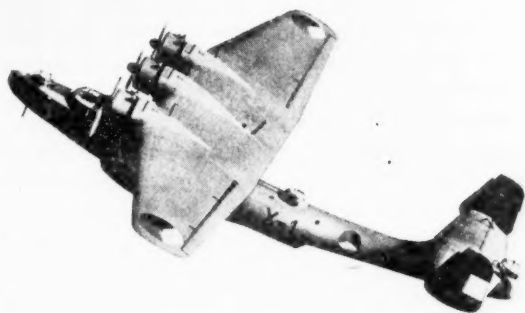
BY COLONEL L. H. BRERETON, *Air Corps*

INTRODUCTION

The strategic conditions affecting the employment of aviation in Spain in support of the land and naval forces

17, at that time the latest types of German pursuit and bombardment. Since then many aircraft of these types have been sent to Spain.

The Messerschmitt-109 is an excellent pursuit plane with a speed of more than 250 miles per hour. There are also, in Spain, a number of squadrons equipped with Heinkels,—which are not the most modern planes—having a speed of approximately 200 miles per hour.



DORNIER DO. 24 OBSERVATION BOMBING FLYING BOAT.—GERMAN

Bombardment types are the Junkers Trimotor (2 models) with a speed of 140 and 220 miles per hour; the Heinkel single motor bomber and the Dornier 17 Trimotor each having a speed of approximately 250 miles an hour. These bombers carry a load of from 1650 to 4960 lbs., to medium ranges.

The Italian pursuit planes are the Fiat with which most of the Italian squadrons at home are equipped. This is an exceedingly maneuverable aircraft with a speed of about 225 miles per hour, armed with 4 machine guns of which 2 are of large caliber (37-mm or 50-mm). These large caliber guns fire a series consisting of 1 tracer, 1 explosive, 1 incendiary, and 1 ordinary bullet. Italian bombardment are mostly the Savoia 79, with a speed of about 220 miles per hour, carrying a bomb load of from 2200 to 3300 lbs., to medium ranges. Both Italian and German air forces have been accompanied to Spain by considerable modern anti-aircraft artillery; that of the Germans, in particular, being excellent. German anti-aircraft guns are considered to be effective to altitudes of 20,000 feet.

2. THE GOVERNMENT.—*a. Personnel.*—The Government forces consist almost entirely of Spanish personnel. They are, in general, very young, and with remarkably high morale. Squadron leaders of pursuit aviation average from 20 to 22 years of age; group commanders from 25 to 32 years of age. The personnel and the commanders of bombardment units average 3 or 4 years more in corresponding ranks. The commanders of higher echelons, who, in general, do not exercise tactical command in the air (i.e., wing commanders; commanders of air regions; Inspectors General, and the Chief of the Air Force) average from 38 to 42 years of age. There is no general officer at the present time in the air force.

The commanders feel that youth is absolutely indispensable for commanders in the air. They also value age and experience. However, officers of these qualifications are to be

found mostly in command of the larger units, bases, in the General Staff, the schools and General Headquarters. While all units are commanded by aggressive officers there is apparent at times a grave lack of judgment, tactical experience, and professional knowledge. All air victories are credited to the squadron and never to a particular pilot.

b. Matériel.—The strength in aircraft is approximately 400 first line aircraft. On the land front, all organizations are equipped with Russian material and American motors (Wright Cyclone). Some organizations have equipment which is obsolescent, with a speed of not more than 125 miles. This equipment carries a comparatively small bomb load and operates at night. Day operations of this equipment are invariably well protected by pursuit. The balance of the units are equipped with excellent modern aircraft, comprising 2 types of pursuit and 1 type of bombardment. The pursuit is the Russian built Chato, an American designed Boeing, constructed in Russia under license. These aircraft were originally designed for operations from sea-plane carriers. They are remarkably maneuverable and possess extreme climbing and diving speed, which makes up to a great extent for their moderate high speed of 210 miles. They are armed with 4 machine guns, synchronized and firing through the propeller.

The Mosca (fly) is a modern pursuit plane with a speed of 280 miles an hour. Its armament consists of 2 machine guns firing from the wings at a rate of 1,800 rounds per minute and possessing remarkable accuracy at 400 yards. The Loyalists consider this equipment to be superior to any possessed by the Insurgents.

Both of these types are equipped with armor which protects the back and seat of the pilot. This armoring gives excellent protection from fire from the rear and from below.

The bimotored bomber "Katiouka" is an excellent bombardment plane with a speed of from 225 to 240 miles per hour, according to the altitude. It has exceptional climbing speed which enables it to outmaneuver the Italian Fiat pursuit plane. It is equipped with modern improvements such as variable pitch propeller, retractable landing gear, and complete instrument flying equipment. Its armament consists of twin machine guns firing forward from a flexible mount; twin machine guns firing to the rear on a flexible mount, and a single machine gun firing below the fuselage. All mounts are counterbalanced and protected against relative wind. The plane is equipped with two-way radio facilities which, however, is rarely used on account of the efficient enemy aircraft warning service. The crew consists of 3 men. These aircraft do not have heaters, and as practically all missions are carried out at altitudes in excess of 17,000 feet, considerable suffering results due to low temperatures.

3. COMPARATIVE AIR STRENGTH.—The Government air force at this time is approximately two-thirds the strength of the Insurgents.

The government factories have materially increased their aircraft production. In addition to the repair and manufacture of existing models, two new types—one a pursuit plane and the other a bombardment-reconnaissance plane—are being put in production, equipped with Wright Cyclone and Hispano motors manufactured in Spain. The production of aircraft is increasing swiftly. Factory equip-

ment is, for the most part, extremely modern, and operates day and night 7 days a week.

A similar pressure of production is being maintained in the air force pilot training centers, communications and mechanics schools.

It is apparent that a belligerent in war can have its air forces reinforced without delay by an ally, provided it has control of sea or air communications. Much of the Insurgent air force has arrived in Spain by air, flying over the sea and friendly countries; or flying by night at high altitude over countries which have forbidden their passage. It is evident that a country with limited aircraft production, faced with an air menace, will, when possible, take steps to provide immediate reinforcement by agreement with its allies. Such an arrangement will permit it to place the whole of its air force in the field at the outbreak of war, with the assurance that it will receive immediate reinforcement and replacement from allied sources. The immediate effective strength can thus be increased at least one-third.

4. **GROUND ORGANIZATION.**—Every possible precaution is taken to furnish protection to ground installations from air attack. Landing fields are plentiful. Air units change their location so frequently that it is practically impossible for the opponent to determine at any time which airdromes are occupied. Normally, one squadron occupies one landing field and never more than two. Aircraft are habitually dispersed at intervals around the landing field, protected by earthworks and camouflage. Personnel is billeted away from the airdromes. Ample transportation is provided to allow rapid movement to the airdrome, or for transportation of the ground echelons when changing location.

a. *Squadron organization.*—Squadrons usually consist of 10 aircraft for bombardment squadrons, and 12 aircraft for pursuit squadrons. In addition, each squadron has 3 spare aircraft on hand and a total of 15 complete combat crews. Aircraft out of commission, or which must be repaired, are replaced from the reserve on hand. Combat crews are replaced in the same manner with a reserve kept constantly on hand.

b. *Technical organization.*—The technical control of groups and squadrons is the responsibility of wing and regional commanders. In general, maintenance and replacement function very efficiently. The squadrons normally have all their aircraft available, due to the reserve in each squadron, and to the excellent provisions made for quick repair and replacement. Each squadron has 5 mechanical starters mounted on trucks. These trucks also transport mechanics, tools and equipment, gas and ammunition. Each squadron is self-contained to the greatest extent, although no surplus supplies are kept on hand.

c. *Repair and replacement.*—Daily maintenance and minor repairs are performed on the airdrome with the aid of mobile machine shop trucks, of American manufacture, well equipped. One such truck is assigned to each squadron. With this equipment it is possible to perform extensive repairs on the airdrome. This avoids the necessity of sending to the rear for repair a considerable number of aircraft, which may have suffered severe damage in transport.

Major repairs to aircraft and motors are accomplished in the air depots and factories at the bases. The presence of machine shop trucks with the squadrons allows 60 per

cent of the repairs to be made at the airdrome as compared to 40 per cent at the depots.

The replacement of aircraft in front-line units averages 25 per cent per month. The number of aircraft lost and destroyed averages 10 per cent a month. Supply and repair depots are fixed installations under the control of the regional commanders and production is increased when necessary by the transfer from one to the other of personnel and equipment by motor transport.

5. **LACK OF RECONNAISSANCE AND OBSERVATION AVIATION.**—There is no organic air service aviation. The air forces consist of pursuit and bombardment only, which perform reconnaissance and observation missions when necessary. Such employment is comparatively infrequent.

Except in regions where front-line trenches and the main line of resistance coincide, as for example, at the end of the operations at Madrid, Brunette and Belchite, the front of either side follows the trace of dominant terrain features. The terrestrial observation and the employment of artillery is such that the maximum support to the infantry can usually be obtained, using ground observation only. As a result, ground observation is used almost exclusively in place of air observation.

Furthermore, observation aviation, which is required to operate over hostile front lines for any appreciable time, as was done in the World War, runs great risk of being destroyed by hostile antiaircraft artillery and pursuit aviation.

Experience in Spain has shown that, in general, the performance of observation missions for the front-line ground troops has proven very costly in aircraft and involves losses not commensurate with the unsatisfactory results that have been obtained.

a. *Reconnaissance missions in the combat zone.*—For missions within 10 to 15 miles of the front lines, observation is carried out by small pursuit patrols operating at altitudes from 1300 feet up. In addition to obtaining information of ground dispositions these formations attack suitable targets when seen.

b. *Distant reconnaissance missions.*—Reconnaissance in the rear areas is performed by bombardment aircraft equipped with automatic cameras operating in formations usually of two, at maximum speed and at maximum altitude (about 12,000 feet).

c. *Air force reconnaissance.*—In each air region, information gained from air force reconnaissance regarding both ground dispositions and air activity are plotted on a chart as received. Changes in time and space of hostile air action and ground dispositions furnish extremely valuable information to the general staff. This method was employed in the French air force with excellent results during the latter part of 1918.

In general, the information received as a result of photographic and visual reconnaissance of front-line activities is poor. However, information of the rear areas regarding bombardment objectives, such as airdromes, occupied barracks, railroad stations, electric power installations, and like targets, is excellent, and has been well exploited.

The measure of efficiency of reconnaissance aviation depends upon the accuracy and the amount of information obtained; particularly whether such information gives timely intelligence regarding enemy ground operations.

It is well to bear in mind that the High Command will never receive adequate information from the air unless an adequate, well equipped air force is available for this purpose.

6. BOMBARDMENT AVIATION.—Bombardment is employed on the battlefield; in the zone of action of the armies, and in enemy rear areas.

a. Bombardment on the battlefield.—The employment of combat aviation in direct support of the infantry, or to augment artillery counterbattery action, demands supporting pursuit aviation superior to that of the enemy. *The effective employment of combat aviation in this type of mission is directly dependent upon the ability to maintain air advantage.*

b. Effective bombardment on the battlefield.—The action of bombardment on the battlefield is similar to that of the zone fire of artillery and lacks precision. Considerable effect is achieved, however, by reason of the number of bombs delivered in each attack, the concentration of aircraft and the continuity of action by repeated attacks. It has great demoralizing effect and has given the impression that bombing attacks are more feared than artillery fire, either on unorganized ground or in trenches. It is most effective against troops not protected by trenches, and particularly when the infantry-artillery liaison is poor. Artillery is not able to support advancing infantry further than to within about 1200 yards of the objective. Supporting bombardment is able to cooperate until the objective is reached.

Many infantry and general staff officers are of the opinion that direct support of the infantry attack by aircraft is essential, and that the further development of offensive arms must include aircraft habitually used in direct support.

The German air forces in particular foresee the necessity for close coordination with ground forces in battle to support the infantry in their advance to the objective. In the last war, tanks were employed to augment the insufficient power of the supporting artillery to neutralize a hostile position. Today the Germans envisage the increase of these offensive means by combat aviation.

c. Bombardment of rear areas.—In 1937, the average distance from the land front to the sea front of the Loyalists was 125 miles. Thus the distinction between bombardment in the army area and bombardment in the zone of the interior is non-existent. All objectives in Loyalist territory are equally vulnerable to attack from either the land frontier on the west or the sea frontier on the east. Air attacks from the Balearic Islands do not penetrate very far from the coast, whereas the land air forces habitually carry out missions 60 to 100 miles behind the front line. It is evident that the geography of Government Spain favors to a great extent the effective action of Insurgent bombardment.

Government air forces are at a great disadvantage in this respect. The average depth of Insurgent territory is about 250 miles from the front lines. Attacks on such centers as Seville, Salamanca, Valladolid, Burgos, and Pamplona, are all long-range missions which are difficult of successful execution in view of the impossibility of maintaining surprise.

d. Attack against the civil population.—The effect of air bombardment against cities is well known. The results of such attacks are very evident in Madrid,—in the French Bridge and University City areas near the front. The appearance of these quarters vividly recalls Verdun, Arras and Rheims during the World War. All houses are more or less damaged by artillery fire and any of the many houses of 6, 7 and 8 floors, which have been hit by 300 lb. bombs, are completely destroyed.

Heavy losses have been inflicted on the civil population compared to the small number of aircraft employed. The number of wounded is also relatively very high. The effect of such bombardment would have been much more serious had either air force been employing chemicals.

e. Bombing missions against distant objectives with high speed aircraft.—The technique of bombing missions differs somewhat, depending upon whether the high speed bombers—the Katiouška—or the comparatively slow bombers—the Natacha—are employed.

The speed of the Katiouška is equal to that of the Italian Fiat, and only slightly less (20 to 25 miles) than that of the fastest German pursuit,—the Messerschmitt. These bombers perform their missions at high altitude and without pursuit protection. Due to their speed and climbing ability, successful interception is rarely accomplished by Insurgent pursuit, and losses are negligible. The speed and range of the Katiouška permits strategic employment of aircraft in support of different theaters of operations. These aircraft, based in the Madrid region, frequently carried out operations against Bilbao and Santander despite the distance between these theaters of operations, which is more than 180 miles.

f. Night bombardment.—In general, night operations are carried out by squadrons whose equipment is too slow for daylight employment, even with pursuit protection. The airplane employed in this type of operation is the Racente, with a speed of about 115 miles per hr., armed with 5 machine guns. The personnel comprises, for the most part, young and inexperienced pilots with less than 100 hours' flying time. Objectives are usually those easy to locate and identify at night by following well defined land marks such as the Ebro River. Considerable difficulty is frequently experienced by these units in finding their way to their home airdrome at night. Such missions are usually carried out during the last hours of darkness. When lost these aircraft are able to await dawn in order to find their way home, or at least back into friendly territory. It is thus evident that even obsolescent aircraft can be used to advantage by taking the proper precautions against objectives which are not adequately protected from air attack.

7. PURSUIT.—The basic mission of pursuit is obvious—to destroy hostile aircraft; the destruction or the threat of destruction being the means of affording protection against hostile air attack for both friendly air forces performing their proper missions and installations on the ground.

In spite of the fact that the lack of pursuit forces in Spain makes it impossible to perform properly its basic missions, pursuit is used, in addition, in the direct attack of ground objectives.

a. Ground attacks.—In connection with missions to protect bombardment attacks, the accompanying pursuit, after the return of bombardment to friendly territory, frequently

returns to attack the same objectives with machine-gun fire, furnishing its own protection during the attack with designated units of its own force. Pursuit is also used to attack hostile aircraft on the ground when favorably disposed.

b. Pursuit against hostile aircraft in the air.—The Government pursuit forces are extremely aggressive in air operations, and in connection with an efficient ground warning service, have met with considerable success in air combat, both against hostile bombardment and hostile pursuit.

c. Morale and esprit de corps.—The development of the essential qualities for pursuit pilots, that is, high degree of individual training, self-denial, patriotism, and competent tactical instruction in the larger units, are among the most important factors by which air superiority is established over the opponent. In addition to this, however, there must exist a feeling of complete confidence in the superiority of the equipment over that of the enemy. Initially, either combatant willingly enters combat. Soon, however, one of the two, impressed with the technical superiority of hostile equipment, will withdraw from the battle, allowing the victor freedom of action to accomplish his air missions.

d. Speed.—The Mosca, with a speed of 280 m.p.h. emphasizes the importance of speed for pursuit aviation. Such high speed impresses the enemy with a feeling of inferiority and greatly increases the aggressiveness of Government pursuit due to the well-founded confidence which they possess in the capabilities of their own equipment.

Contrary to prevalent ideas formerly existing in France, this great speed does not prevent attack of other high speed aircraft either from front or rear. Actually, this type of pursuit plane frequently attacks from the front. It is true that in this method of attack the hostile aircraft approach each other at very high speed—from 250 to 300 yards a second. However, the rate of fire of the Mosca is about 600 rounds per second. Fire is frequently opened at a distance of 600 meters or more and this rate of fire has met with unusual success, although not possible for more than 1 or 2 seconds.

e. Maneuverability.—The importance of maneuverability is well illustrated by the Chato pursuit airplane. Pilots equipped with this plane prefer it to the Mosca, which has superior speed, due to its excellent maneuverability as a result of which inferior speed is neutralized to a great extent. These airplanes are very successful even against the German Messerschmitt, which has a considerable superiority of speed but much less maneuverability.

When attacked from the rear, these planes are well protected by the armor around the pilot. After the attack has passed by, they are usually well disposed for counterattack from the most favorable position and with a superiority of maneuver power. If attack from the rear is foreseen, these aircraft can turn on a very short radius and attack their adversary from the front. This maneuver is particularly feared by the Italian Fiat, due to the vulnerability of their water radiators to attack from this angle. The maneuverability of the Chato and its strong armament (4 machine guns) makes it perfectly willing to accept attack from the front.

In air combat, coordinated with the higher speed Mosca, they are remarkably efficient. In combat, the speedier Mosca is frequently able to break up the hostile formations, dis-

organize them and force them to lower altitudes towards the Chato formation. These latter, due to their superior maneuverability, are particularly efficient in broken combat. Thus proper coordination of these two types frequently achieves maximum results by exploiting to the utmost the best qualities of these two types.

f. Armor.—Protection to pilots previously referred to reduces greatly the danger of surprise attack from the rear, most feared by any monoplane pursuit, due to lack of protection and fire power in that quarter. Pursuit does not hesitate to penetrate distances of 30 miles within the hostile lines, even when protecting slow bombardment. It will be remembered that during the World War, when penetrating the hostile front to a distance of even 12 miles while protecting slow bombardment, pursuit losses were excessive.

g. Armament.—Necessity for powerful armament is demonstrated by the Loyalist Chato; the Italian Fiat, and the German Dornier seaplane. Fiats have shot down Natcha bombers by attack from the rear at distances of 500 to 600 yards without ever having been brought under hostile fire.

The Dornier seaplane has a speed of only 110 miles an hour. However, it is armed with cannon firing both to the front and rear and has demonstrated beyond doubt the efficacy of long-range cannon fire.

h. Night operations.—The Chato, due to its maneuverability and excellent field of vision, is an effective plane for night operations, even beyond the range of searchlights.

8. ANTI-AIRCRAFT DEFENSE ORGANIZATION.—The anti-aircraft defense organization is under the direction of the commander of the air forces and centralized in the air force general staff where the telephone communications are highly complete and efficient. This centralization is modified by the initiative allowed to Chiefs of Defense Sectors to act in accordance with the local situation. This method of control exercises effective economy in the employment of pursuit.

a. Aircraft warning service.—The Air Defense Commander receives information through the centrals of the ground warning service, which in turn are in continual communication with well organized and extensive listening and observation posts. The use of radio by the air forces of either side is reduced to a minimum. It has been found that the radio interception gives excellent indication of hostile aircraft locations and routes and enables interception to be effected with considerable success. The anti-aircraft warning service organized both in width and in depth throughout the front is highly efficient. However, there is one serious deficiency: the use of the radio telephone from ground to air, and between defensive units in the air, would permit much more effective employment of pursuit. An attempt is made to overcome this defect in communications from ground to air by means of visual signals on the ground.

b. Air reconnaissance.—French critics have expressed the opinion that if the two combatants had not neglected air reconnaissance and surveillance, the surprise invariably achieved in ground operations could not have happened, particularly as to the strategic movement of reserves that preceded the offensives at Bilbao, Santander, Brunette, Belchite and Teruel.

The reasons for ineffective results of air reconnaissance have been partially explained. The great extent of the

front; considerable interval of time elapsing between offensive operations and the enormous amount of work and aircraft involved in air reconnaissance of sufficient strength to furnish the High Command with adequate information, is beyond the capabilities of the comparatively small air forces involved.

It is surprising that neither of the combatants has profited to any extent by the delivery and recovery of agents behind the enemy lines and the employment by such agents of carrier pigeons. Such means, in coordination with air reconnaissance, would relieve the air force of a great part of an impossible burden, which renders it less effective in its proper combat role.

It is evident that the lack of organic observation aviation in the ground armies will cause serious disagreement between the ground command and air command, if the former must rely only upon observation placed at his disposal, but nevertheless operating under the control of the air army.

c. Army observation and cooperation with ground troops.—Air observation of the enemy throughout the immediate front of the armies furnishes the High Command with information at least as valuable as long-range reconnaissance, and is an easier task. This task should be performed by organic observation with the armies and army corps, which, in addition, performs cooperative missions for the artillery and liaison missions for the infantry. These forces are definitely ground cooperation aviation. They do not exist in Spain. Considering that a division front may extend 25 miles, or more, and that army corps operate on fronts of 60 miles, this lack of corps and army aviation is astounding. In this connection it must be remembered that such cooperative aircraft must be modern and capable of employment without the protection of pursuit.

The creation of adequate organic corps and army aviation would require at least one-half of the government air forces. Such a diversion of air forces is unacceptable in view of the fact that the development of aircraft tends more and more towards the concentration of the mass of the air forces under centralized command for concentrated employment.

The employment of organic air observation with the ground forces, particularly in the restricted air areas of close cooperation with the ground forces, is not in accordance with the doctrine of centralized control and mass employment of the air force. On the contrary, the employment of such aircraft is isolated—usually individual—closely coordinated with the operations of the ground forces and directly commanded by the commander of the ground forces. *Actually they have no tactical connection with air force operations and should therefore not be organically included in the air force.* As is the case with naval aviation, their personnel should be included in the ground army, and integral with the ground army organization. Experience in Spain makes this evident.

d. Employment of bombardment.—In Spain, the employment of bombardment in direct support on the battlefield, has produced excessive losses to air forces for two reasons: first, due to hostile pursuit, because the security from surprise in such action is lacking; second, as a result of antiaircraft artillery fire, because such operations must necessarily be carried out at low altitude.

Losses in this type of action are considerably less when aircraft are small, maneuverable, and possess high speed with the ability to execute diving attacks. An air army should include this type of aircraft, generally called attack aviation.

Multi-motored aircraft may be employed in direct support of the ground battle but must remain at high altitudes, and consequently their objectives must be area targets of proper size.

Air operations in rear areas beyond the combat zones are the least difficult and are frequently conducted without loss. The hostile front in the ground theater of operations in Spain is approximately 930 miles long, and, for the Insurgents, is protected by a pursuit force of from 250 to 300 aircraft. As compared to this, the Western Front in 1918 was from 440 to 500 miles in length and was covered by a force in excess of 1,000 allied pursuit aircraft in 1918. In a European war, the difficulties of air operations in hostile territory will be greater than has been the case in Spain, depending upon the size of the pursuit air forces available, as compared to the area to be defended.

e. Bombardment versus pursuit.—The war in Spain has thrown considerable light on discussions as to the relative value of pursuit and bombardment.

The fact that bombardment has frequently equalled pursuit in speed, has enhanced its value to a great extent. However, it is true that certain bombardment units are, and will probably remain, slower than pursuit and also that pursuit can increase its normal speed greatly by diving attacks. When bombardment is acting in direct support of the ground forces on the battlefield, it is frequently necessary to continue its missions while fighting off hostile pursuit. In this case great advantage undeniably rests with the pursuit. Spanish authorities are unanimous in the opinion that pursuit superiority is of paramount importance, particularly with the armies in battle. Superiority of pursuit directly affects the security of the whole air force and the armies at the front, and affords freedom of action for the performance of bombardment and reconnaissance missions throughout the entire battle zone.

Superior quality of equipment is imperative.—The number of pursuit aircraft that is possible to maintain in front-line service is greatly reduced due to the necessity of frequent replacement and overhaul. Considering the initial effective strength at the outbreak of hostilities, a greater proportion of bombardment may be maintained in service due to the more moderate requirements of replacement and overhaul. This tends to increase the effective strength of bombardment as compared to pursuit. In view of the high overhaul requirements of pursuit aviation, it is essential, in my opinion, that reserve units be maintained in at least equal strength to those of first-line pursuit. Even if such reserve units are equipped with inferior planes, as the Chato units for example, they can still perform invaluable service by furnishing pursuit echelons for local defense.

f. Technical superiority necessary for pursuit.—It is of paramount importance that continuous effort be exerted to maintain the highest possible standards for both matériel and personnel.

Both experimental types and service types must be produced at a maximum speed. Inasmuch as superiority of

quality for pursuit is all important we must not hesitate to put in service units equipped with outstanding foreign equipment and to maintain groups thus equipped for service test. This would be of the utmost value in time of peace, and in the first days of war, provided that foreign equipment could be procured. Pilot personnel must be maintained at the highest possible standard. Commanders up to and including the group should not be more than 30 years of age.

g. Technical superiority necessary for long-range bombardment.—The necessity for technical superiority of long-range bombardment and reconnaissance is equally important. It must be remembered that these aircraft must operate without the benefit of pursuit support and that the success of their missions depends to the greatest extent upon their ability to outrun hostile pursuit. Personnel manning this equipment, including group commanders, should not be more than 4 or 5 years older than pursuit commanders.

h. Air forces in the decisive role.—Many critics have expressed surprise that the air forces, by concentrated action against hostile air forces, depots, lines of communication and bases, have not been able to exert a decisive influence in the operations of the armies. Such criticism shows clearly the grave misconception that exists as to the ability of comparatively weak air forces to intervene decisively in war. Furthermore, such criticism ignores the importance of the time factor essential to the development of adequate air forces after the outbreak of war.

The capabilities of the air force are strictly limited by its effective strength.

The opposing air forces in Spain possess but a few hundred aircraft. In view of this fact, each has employed its air forces in strict accord with the correct basic principles of war—economy of force and mass. The application of these principles consists in determining from the enormous category of tasks facing the air force, that task which is the most important at the time, and which also offers the greatest chances of ultimate success for the common mission, and, once having determined the task, to concentrate the whole air force in its accomplishment.

An adequate air force must have available thousands of planes if it is expected to successfully fulfill all the tasks contemplated, and to exert a decisive role in war. In both Italy and in Germany the production of aircraft has reached a level which will fulfill the initial replacement requirements for an air force of great size. Furthermore, even at present aircraft production in both these countries is allowing them to enlarge their first-line air forces to an impressive figure.

i. The time factor in mobilizing the maximum air force.—The serious delay that will be experienced, even under full production conditions of warfare in increasing the air forces, is worthy of the most serious attention.

There is considerable difference in the time element necessary to produce complete observation, bombardment and pursuit units. Observation aviation will require the greatest amount of professional instruction and training. These units require a long training period in common with

the troops with which they must serve, in order to be of value. The organization of new units of this type will require the greatest period of time if it is necessary to completely train and equip them. This time will be reduced if their personnel can be drawn from the ground army. It is a remarkable fact that in Spain, after 18 months of war neither side has any observation aviation worthy of the name.

Training of bombardment crews will require a similar period. It has taken the Government 18 months to organize approximately 200 well trained Spanish bombardment combat crews.

The easiest task is to train the pursuit personnel and manufacture pursuit equipment. The Government has organized and placed into service a considerable number of efficient pursuit units with entirely Spanish personnel with an average total flying time of less than 8 months. This type of personnel requires a very rudimentary military education only.

Production of aircraft matériel will require, in general, a shorter period of time than the training of personnel, provided the necessary factories and installations are available. This period can be reduced to a negligible point, if foreign equipment is available, as has been the case in Spain.

Pursuit planes can be produced much more quickly than can either reconnaissance or bombardment, due to their size and to the lack of necessary accessory equipment. They can also be imported in greater numbers in less time.

It follows that the following requirements in peace are essential for the proper maintenance of an effective air force in time of war.

- (1) There must exist a large bombardment force.
- (2) There should exist in the ground army sufficient partially trained personnel to equip the additional observation cooperation units required upon mobilization.
- (3) The industrial mobilization of the aircraft industry must be such that the maximum production of pursuit aircraft can be achieved not only at the outbreak of war, but even in periods of political tension such as exist today.

j. Time factor of aircraft production, as compared to artillery, tanks and warships.—A much greater production rate for aircraft is possible, than is the case for tanks, cannon or ships. In Spain the rate of production for aircraft matériel has, at this time, reached a remarkably large scale, particularly with the Government and at the present rate it will very soon exceed the French. However, the production of tanks is at a minimum—that of cannon and ships is practically non-existent.

10. CONCLUSION.—The war in Spain demonstrates conclusively that air power is a subject of vital importance to the whole nation—army, navy and civilian alike. It is absolutely essential, therefore, that the government and the high command appreciate and understand the general conditions affecting air warfare and the factors that are essential to adequate air power.

LESSONS OF THE SPANISH WAR

["Les enseignements de la guerre d'Espagne,"
Condensed from *Revue d'Infanterie*, November 1938.]

BY MAJOR E. M. BENITEZ, *Coast Artillery Corps*

TACTICAL DOCTRINES

Infantry

While many experts visualized the war of the future as an engagement between tanks, airplanes and cannon, the Spanish Civil War has disproved this theory and demonstrated that matériel cannot replace men.

The war has shown that the infantry remains the preponderant arm with all other arms subordinate to it. In fact, war in its last analysis can only be decided by the infantryman, irrespective of technical developments.

No one can deny that improvements in matériel and augmentation in fire power of small caliber weapons have increased the power of the defense. However, the value of the offensive as compared to the defensive has not changed. Infantry, well equipped and well trained, maneuvering and attacking in liaison with other arms, will always obtain more positive results than a force tied down to a position despite its numerical strength. On the other hand, improvements in armament, particularly that of the infantry, has had limited success and brought about stabilization. Without fire, advance is impossible.

The heavy type machine gun has remained the principal arm in the infantry combat zone, while the light machine gun or automatic rifle has not lived up to expectations in the attack and has lacked efficiency in the defense. However, the French feel that this remark does not apply to their own light automatic arms.

The infantryman, armed with the automatic rifle and the hand grenade, remains the basic element of combat; there are some who think that light infantry units should be supplied more abundantly with hand grenades and with a smaller number of light machine guns, at the same time adding the automatic pistol.

Experience has shown that the mortar is an offensive weapon of first rank, while the efficiency of the antitank gun has made it necessary to arm the infantry with a gun of that type possessing great mobility and high rate of fire.

Tanks

The antitank gun has disproved the theories of many experts who expected too much from the tank.

Small caliber cannon and heavy machine guns have readily pierced light tanks, despite their mobility, showing that the speed factor of the tank lacks the protective value claimed by some observers.

The tank can only accomplish efficient results when protected by artillery and in close liaison with the infantry which supports it. This confirms two important lessons of the World War, namely, that tanks cannot be employed in mass on a wide front, and that tanks cannot fight without the protection of the artillery and the support of infantry, which alone is capable of mopping up and occupying the terrain.

An Italian officer, Lieut. Colonel Canevari, calls attention to the following points:

- (1) The use of light tanks as flame throwers.
- (2) Heavy tanks have shown superiority in meeting engagements between tanks.
- (3) The possibility of an automotive cannon based on the idea of the heavy Russian tank. A heavy tank, invulnerable to musketry and machine-gun fire and employed in rear of strong advancing infantry, can assure closer artillery support than is the case at present.

Artillery

There has been a great lack of heavy artillery in the Spanish Civil War. As the writer points out, corps artillery constitutes the real force of the attack and consequently there will never be enough artillery of this type. Furthermore, it should be borne in mind that the 105-mm matériel is not heavy artillery.

The cooperation between the infantry and the artillery (infantry-artillery team) becomes more necessary and at the same time more difficult. The best infantry in the world cannot hope to succeed unless it is accompanied and supported constantly by powerful artillery—powerful not only in numbers and caliber, but also in ammunition supply.

Continuous fire support is necessary; it follows, therefore, that the artillery should be motorized. The question that must be solved is the extent of this motorization, because too much motorization constitutes an impediment.

Large Units

General Giacomo Carboni, Italian Army, has recently attempted to show that the "binaria" division is the most suitable type for combat in a moving situation. His plan calls for a division of two infantry regiments, one regiment of field artillery and other powerful elements, such as mortars detachments which furnish great offensive capacity when the attacking infantry requires additional artillery support. Mortars will not make the division too heavy, he writes, because the machine guns will be placed under the corps, thus making possible the utilization of the defensive characteristics of the heavy machine gun on more extended fronts.

While it is not known whether or not this type of division has been used in Spain, Colonel Canevari mentions certain actions in which divisions made up of six infantry battalions have been employed.* However, these units—whether they are called divisions or reinforced brigades—have insufficient power of resistance, thus making necessary their early relief. In order to have continuity of action, it becomes necessary to make the army corps the battle unit. As such, it should consist of a variable number of mixed brigades, reinforced by supplementary infantry regiments and supported by a powerful artillery, which should be likewise of variable composition.

*Editor's Note.—According to reports, the "binaria" division was tested in combat in the recent Catalan drive in Spain. The organization proved to be very flexible and, in general, the results were very satisfactory.

CONCLUSIONS

The following conclusions are drawn by the author:

(1) *Matériel*: Mortars, antitank guns, machine guns, antiaircraft artillery, heavy tanks and attack aviation have demonstrated their value in actual combat.

(2) *Tactics*: Sound theories have proved to be successful in practice. Among them, the following are worthy of mentioning: Successful use of aviation in attacking ground troops; necessity of cooperation between the infantry and the artillery and the judicious motorization of units.

INFANTRY IN THE BREAKTHROUGH

["Infanterie in der Durchbruchschlacht," by Lieut. Colonel Baentsch, German General Staff. Condensed from *Militärwissenschaftliche Rundschau*.]

By CAPTAIN H. N. HARTNESS, *Infantry*

We live in an age of technical refinements. All professions are working with more perfect machines. But this in no way depreciates the value of man. On the contrary, spiritual, moral and bodily energies are released for greater accomplishments. Modern developments are of advantage to the infantryman. It is his mission to bring effectively against the enemy these modern weapons. And such a mission does not imply that the importance of the individual has decreased. Small groups and the individual soldier are bearers of these weapons. In fact, the importance of the individual has increased. It is essential that the individual soldier be tactically and technically trained to employ independently the modern weapons so that with this training and these weapons he can act decisively at the decisive time and place.

The infantry must possess assault power and fire power. The term assault raises the picture of hand to hand combat with rifle butts or bayonet. Earlier, such an assault culminated the attack. In the future we can expect the assault but to a much smaller extent. Even during the World War examples of the close hand to hand conflict were scarce. In its stead we found the machine gun, the rifle, the pistol and the hand grenade, fired at close ranges. In the assault battalions were found various medium and light weapons, employed as a whole to achieve a given result. The assault today is fire power brought to bear at close range. Assault power is developed by driving forward the source of fire power. It is the uniform mission of the infantry in attack to bring forward the greatest possible fire power, loose it on the enemy and to drive with this fire power into his lines.

I

The attacker, prevented from an enveloping maneuver must often drive through a well prepared, deeply organized hostile position. It is only when the hostile position has been penetrated and freedom of maneuver has been gained that the attacker can complete his victory. The successful breakthrough creates the possibility for strategical operations. The tactical problem of the breakthrough is essentially an infantry problem.

Because he has selected and reinforced the position he will defend, because he is more familiar with the terrain, both in and in front of the position, than the attacker, and because he will have favorable observation, the defender can, as a rule, employ his fire means with the maximum effect.

The zone of fire in front of the position will be carefully organized so that practically every avenue of approach, in fact almost every inch of terrain, will be covered by fire. By well prepared cover and camouflage the attacker can be deprived of bringing his fire most effectively on the weapons and troops of the defender. Reserves can be protected against the fire of the attacker, and whether employed in counterattack or to support a threatened area they can be employed with surprise and, in comparison to those of the attacker, fresh. The approach to, and the attack on, the main battle position will be made more difficult by demolitions and obstacles. The natural defensive features of the terrain will be augmented by man-made works. By both passive and active means the effects of air and tank attacks can be lessened.

II

1. The air arm alone can turn a continuous prepared trench system. By combatting successfully the hostile air units, the attacker's air support can protect and screen the assembly areas of the attacking infantry and thus guarantee surprise, so essential to the success of the attack. The air support must be employed at the decisive time and at the decisive place in order to gain air superiority to the greatest extent possible. The air arm should maintain such superiority as to permit it to strike reserves moving forward before these can influence the infantry action. As a rule during the World War a fortified area could be taken only when it was cut off. Verdun withstood repeated attacks because reserves were not blocked; it received reinforcements continuously. Confronted by a long continuous trench system, whose flanks are secure, the attacking army alone will seldom be able to cut off a given area of the defended front. The cooperation of the air arm will prove of paramount importance in such operations. Which means that a portion of the air force must act in close cooperation with the attacking infantry.

2. A position flanked by terrain over which tanks can not operate and which is strengthened by all sorts of obstacles and defended by antitank guns can not be overrun by tanks. Infantry, supported by other arms, must break into the hostile position, disrupt the antitank defense and advance sufficiently far to permit engineers to open routes for tanks. Only then can tanks be employed to strike deeply. But, again in the battle position, possibly, or in rear of the position there will be found terrain secure against tank attack, either naturally or made so by the defender. And once more the infantry must advance without tank assistance.

On the Somme, on the Aisne and at Arras tanks were employed in cooperation with infantry against machine gun nests. The success achieved was not worth the expenditure; in practically every instance during the World War a successful breakthrough resulted from thorough preparations, even without tanks. The advance was stopped when the support, provided at the jump-off, reached its maximum effective range and the attacker ran into the machine guns

echeloned in depth and the hostile artillery. It then became necessary to reorganize the attack, especially to build up a new supporting fire support. Finally, more mobile and more rapid tanks were constructed. These were released from close cooperation with the infantry; they were employed in mass against rear machine gun nests, reserves and artillery positions. They were employed for the *breakthrough*, not for *breaking into*. Cambrai, Amiens, Soissons.

Confronted by modern artillery and antitank defenses the mass of the tanks can not tarry long in the fire covered zones of the forward machine gun nests. The beating down of individual nests costs too much time. The surprise effect will be lost if the tanks do not drive rapidly against rear areas, in order to destroy the heavy weapons located there, to prevent the organization of a rear defensive position by reserve infantry and antitank weapons and to strike the framework of every defensive position, the artillery. Planned and prepared positions are frequently connected with the rear by long tunnels. In the rear areas reserves are held in readiness in protected locations. From the annals of history we know that an attack against the front of a fortress is extremely difficult if a simultaneous attack is not launched against a vital flank or rear. As a rule, such a simultaneous attack is the severest test the defender must withstand and most quickly reduces his will to defend. Similarly tanks must endeavor to push rapidly into the rear, vital areas of a fortified position. It goes without saying that tank units must be attached to the following infantry so that it can advance rapidly.

Tanks can not take over the missions of the attacking infantry. *They can make possible, and that is often decisive, the more rapid execution of the infantry mission, with fewer losses.*

3. The primary mission of the artillery is to silence or neutralize as many sources of hostile fire as possible in order to disrupt the defender's organized fire plan. But during the World War, barrages and concentrations fired for days and at untold expense did not succeed in destroying totally the field fortifications. Those who saw on March 21, 1918 the British position after the German bombardment were astonished at the little damage done to matériel. Bombardments during peace field firing produce a proportionately small amount of matériel damage. Artillery can, by combatting the hostile artillery and machine gun nests, at least temporarily so quench the hostile fire that the infantry can work itself close to and into the hostile position. It can batter rear areas, it can partially destroy exits from ground shelter, it can make shambles of the terrain in and around machine gun nests. But we must remember that artillery can not be certain of destroying strongly constructed shelter. *The least of the fortified areas fell during the world war, not because the works were ready to fall but because the garrison was ready to give up.* The fire of medium and heavy artillery puts tremendous pressure on the physical and spiritual man, but when the fire ceases this pressure soon diminishes. Consequently, this pressure from the artillery fire can only be utilized to the fullest when the infantry drives in rapidly behind it. The infantry must follow closely the artillery fires.

The artillery is a tool of heavy, but coarse work. It achieves its greatest success against flat terrain. Its posi-

tions must be sufficiently distant from the objectives and consequently distant from the observation stations. These distances react unfavorably on the accuracy of the individual round. Consequently, against entrenched objectives effective artillery fire must consist of a mass of fire, at great expenditure of ammunition. Objectives of this type in the forward zones can better be engaged by other weapons and at less expenditure of ammunition. Many of these objectives will show themselves for the first time during the course of the attack and can be quickly fired upon only by weapons well forward. An attempt by the artillery to combat targets near our own infantry will endanger that infantry. The greater part of the artillery must fire upon distant targets and especially must execute counterbattery.

III

1. The foregoing considerations have led to the development of smaller heavy weapons which can be employed forward with the infantry and which will augment artillery fires. The missions of these weapons are: (1), to reinforce the fires of artillery on near objectives and (2) to combat individual targets from forward positions. In an attack against a prepared position, these individual targets, often of a decisive nature, will emerge in great numbers.

In a war of movement the attack order will provide for artillery support primarily by stipulating zones and objectives, with perhaps brief additional instructions. It is primarily the task of the lower commanders to determine the fire activity of the individual artillery units. Only by a flexible artillery support can a well prepared defensive position be taken. As a rule, the regimental commander will be unable to observe his entire zone. The heavy infantry weapons must be employed well forward, so that they can reach deeply and accurately into the hostile position. The regimental commander can not retain them under his command in order to provide himself with a flexible fire reserve. They must be employed on too broad a front. It is his task to provide the additional means and a zone of action to the battalions, to assure artillery and tank support (when available) for these battalions and to push forward the attack in the desired direction by the employment of his reserves. The infantry battalion must be visualized as a fire unit, even as is the artillery battalion. Effective infantry fire is achieved by a combination of high angle and flat trajectory weapons. The first strikes the defender in his cover, the second hits when he returns the fire or moves from his cover. Therefore, flat trajectory weapons (machine guns, rifles, machine pistols) and high angle trajectory weapons (infantry cannon, grenade throwers, hand grenades) must be found in every infantry unit. High angle fire is especially important against an enemy in a prepared position.

The battalion commander has the machine-gun company at his disposal and in an attack on a narrow front an interior battalion or battalions can be reinforced with the machine-gun platoons of the reserve battalion(s). Moreover, the antitank company platoons can be employed for direct fire against machine-gun nests, although the small shell promises little more than moral effect. These antitank guns have the primary mission of antitank defense yet at the decisive time they should not remain inactive, provided a useless expenditure of antitank ammunition does not result. They may be

employed well forward to fire upon reinforced strong points.

The one or two platoons of the regimental infantry cannon company which can be allotted a battalion in the attack are insufficient. We need only contemplate the mass of heavy and medium Minenwerfers used on March 21, 1918 to reinforce the artillery fires. A thoroughly organized position can be taken only by vastly superior fire. As mentioned before, no amount of fire can thoroughly destroy the thoroughly prepared position, with concrete strong points, dugouts and trenches. It is possible to employ smoke to blind the enemy and in combination with high explosive so to shake him physically and morally that he can be defeated before he can regather himself for defense.

Infantry battalions employed in the breakthrough must be reinforced with infantry cannon companies, especially, heavy cannon. Both the companies and the ammunition must be provided early, with the ammunition laid down at the positions before the attack is launched. In order to be able to advance the heavy weapons and the ammunition, cross-country tractor type armored vehicles must be provided.

By a combination of flat trajectory (machine guns and antitank guns) and high angle fire (light and medium infantry cannon) weapons, the battalion commander must constitute individual fire groups for special tasks. These groups within the battalion can only operate satisfactorily and in harmony when sufficient and satisfactory communication means are provided. Close cooperation with the artillery is indispensable. The battalion commander must allot observation and firing positions to these groups, he must assign missions for the attack and its continuation. Special provision must be made for displacement in order to provide support for the attack as it advances. We thus see that the task of the infantry battalion commander is similar to that of the artillery battalion commander.

With the means indicated, the breakthrough should be successful. But they do not suffice to guarantee, as the world war demonstrated, a continuous advance deep into hostile territory, whether supported by a tank map or not. For continuously will capably led, dug in and camouflaged machine gun nests bob up and these will force the attack to slow, step by step advances. For final success it is essential that the infantry gain ground rapidly. Well prepared machine gun positions can not be knocked out sufficiently fast by weapons at great distances. The weapons used against these machine gun nests must be employed well forward, but such a procedure is often possible only when the weapons are armor protected. To provide mobility to the heavy infantry weapons some countries (for instance, England) have provided motor transportation for these weapons. Such a solution is dependent on the question as to what extent a country can provide motorization within the infantry. Lack of raw material and gas and oil may force a veto to such a solution.

In other armies the attacking infantry is supported by accompanying tanks. Frequently old type tanks are used for such employment. Apparently in France the new Cher D will be used as supporting tanks to strike deep while the old Renault will be employed on accompanying missions, especially to beat down machine gun nests in the forward areas. Since the accomplishment of the missions requires in the tank special qualities, the Renault type is not entirely suited.

Such tanks must browse almost continuously in the shell torn battle position, they must be able to deliver effective fire at close ranges. Therefore, a suitable weapon as armament will be a short cannon or machine gun that can fire, with the minimum dead space, into covered positions. For the destruction of machine guns firing from armored pill boxes a flame thrower will probably be the best weapon. Moderate speed and small radius of action will suffice, since advances far beyond the infantry are not contemplated. The front of this type tank should have heavy armor, other areas need be protected against fragmentation only, since these tanks will be protected by the infantry weapons against antitank guns. For these reasons, the tank need be armed with one weapon only, since it, under supporting infantry fires, will attack individual, fixed targets only. Above all, this tank must be a small, low vehicle. One thing is certain; the accompanying tank must possess different characteristics from the tank intended for operations deep into or behind the hostile lines. Perhaps England's "tortoise," an armored motor vehicle, manned by one soldier in the prone position, who both steers and fires, will lead to some sort of solution, of course, the operations of such a vehicle in close proximity to the enemy is questionable.

2. A defensive position, well organized and manned, is like a sieve. Place what you will in this position, small groups and individuals will be able to sift through. Therefore, in the employment of the rifle company every effort should be made to advance the minimum number of men with the maximum amount of fire power, both flat trajectory and high angle, against and into the enemy position. Today the assault must be measured in terms of fire power.

In many armies today rifle companies are provided with machine guns, which are capable of providing supporting fire to the attack most rapidly when and where it is most urgently needed. Such an allotment has many advantages.

In the shell torn battle fields of the World War the light machine gun was often employed as the point of the attack. It and the grenade throwers advanced together. It was brought within close range of the objective. At distances of 20 to 30 yards it fired on the terrain wherein the enemy sat, letting loose not bursts of 2 to 5 rounds, but blasting with all the magazine held while the grenade throwers peppered the same area with their grenades. The light machine gun crew and the grenade throwers worked together as an assault group. The terrain, torn up and poor for observation, did not permit cooperation between flat trajectory and high angle fire weapons separated by considerable distances. Such terrain did permit the close advance and cooperation of the units forming the assault group. With the modern light machine gun even better results can be expected.

The problem of the "blue zone," that is, the support of the attack during the last 200 yards in front of the hostile position has been unduly discussed. In the World War this problem produced no great difficulty because the hostile lines and positions were definitely known and the artillery and mine thrower support was accurate and effective on these known forward areas. The leading infantry companies, without firing, advanced closely behind the supporting fires and crossed No Man's Land in one mad dash. When proper preparations were made the "break in" was nearly always successful. The problem of the support of the at-

tack grew to its full stature once this initial "break in" had been accomplished and the advance into the hostile position continued. Frequently, in this advance, the attack was held up by strong points. In terrain poor in observation facilities and in nebulous situation the artillery, Minenwerfer and heavy machine guns were unable to support effectively this advance. Occasionally, heavy machine guns and less occasionally, light Minenweifer, could be brought forward rapidly so that the necessary fire support could be provided without endangering their own forward infantry. Today's light infantry cannon (75-mm in Germany) is too large for employment forward with the infantry "assault groups." Armored vehicles (tanks or something similar) will often be unable to advance rapidly enough to provide the necessary support. Visualize a prepared position, with all sorts of man made obstacles and mine fields. For these reasons the small grenade thrower or mortar, with short range, has been developed, a small weapon, easily and rapidly carried forward by hand, which needs but little cover and which can be employed close behind the forward infantry units ("assault groups") to provide the essential high angle close support fires. Such weapons can shoot over the heads of its own infantry, no matter what the terrain, a great advantage which the machine gun lacks. The medium mortar or grenade thrower, with a range of 2000 yards, can be employed either from greater distances or, in favorable terrain, close in behind the infantry. Since neither of these weapons can lay effective fire on weapons or observation posts within armored protection, both should have smoke ammunition available.

During the war of position, as exemplified in the World War, the rifle gradually lost much of its importance. But it is an error to attribute this lessening of importance to lack of adequate training given replacements. The best trained combatants, officers and noncommissioned officers, laid aside the rifle for the machine gun and rifle grenade, whenever such was possible. A light machine gun, fired from a low tripod or bipod, offers the same target as does the rifle, but its effective fire is vastly greater. Furthermore, there is a great psychological factor in the machine gun's favor. The regular tempo of the machine gun creates in the firer a cold blooded will to destroy. He forgets all danger. The rifleman, on the other hand, must unload and reload after each round, during which operation he has time to consider his own safety. An enemy peppered by machine gun fire develops a feeling of helplessness; one opposed principally by single shot weapons will arouse himself more readily to counteraction.

In a war of position effect is not secured by the carefully aimed individual shots. Rather, the enemy who suddenly emerges from cover and again rapidly seeks cover must be taken under rapid and powerful fire. Seldom will the targets be clearly defined; the use of camouflage and cover by the enemy will force the attacker to designate terrain objectives upon which to fire. These terrain objectives must be held thoroughly under fire for a short time while the grenade thrower destroys the invisible enemy. It is at matter of effective, heavy fire combined with the simultaneous employment of hand grenades. In a war of movement, where the enemy is forced to provide living targets in the open for a

considerable time, the rifle will not prove so inferior to the machine gun.

In trench warfare the rifle equipped with telescopic sight, will find its best use in the hands of the sharpshooter firing on immobile point targets, such as observation posts. But for firing on suddenly appearing targets at close range the new pistol and sub-machine gun will be found superior to the rifle.

Seldom will hand to hand or bayonet close fighting occur. The bullet at close range and the hand grenade will be decisive. Yet the modern automatic weapons are sensitive and perhaps too easily rendered unfit for use. Consequently, the soldier must be thoroughly schooled in the use of, and be imbued with trust in, the bayonet. Only with such training and trust will he ever push on, no matter what technical deficiencies occur in his firing weapon.

For the manner of combat within the infantry companies against prepared positions we turn to the great battles of 1918. During training the following picture was presented: the platoon advanced in two or three waves, the groups (squads) with considerable interval between individuals. The company in turn advanced in three or four waves. But what occurred in combat? Very soon the broad waves were framed into narrow streams. The soldiers moved into small groups. Shock action troops! Various causes contributed. In the shell torn areas and the smoke of a great battlefield broad formations can not be led. The terrain permits advances only in spots. The soldier, even when only five or ten paces from his nearest comrade, feels alone. The individual soldier, advancing over trenches and shell torn areas, sees little. They draw together, following the forward individual. That is human and for effective combat is necessary. Therefore, it should not be left to chance to form these shock troop groups. They should be formed and trained as such. In combat seldom is a flat plain without cover to be found. Grass, trees, ditches, roads, farm houses, shell holes all provide cover. In battle that which the individual soldier can command with his eyes is very small. The leader can lead only those who are in close proximity to him. In such situations is the present group (13 men in the German Army) too unwieldy, too complicated. It is not possible that a group 15 paces wide and at least 40 paces deep or a squad of 7 men and a corporal in line (35 paces wide) can fight as a unit. The average man can not, in the turmoil of the great battle, withstand the pressure. In trench or position warfare the group must fight as a unit, as a compact shock action unit. As a rule, in terrain of the battle field, the fire of the light machine gun, the hand grenade and of other close range weapons, must be delivered from one location in order that they be delivered decisively on the objective. Therefore the group must be composed of these various weapons and must be viewed as the smallest, inseparable fire unit. It must be small and easily handled. Because of the limited use of the rifle, three or four riflemen, a light machine gun with ammunition and two handlers, three riflemen with pistols and with an ample supply of hand grenades and the leader equipped with a sub-machine gun will comprise the group. More can scarcely be led by one man and fight as a unit.

During the World War night attacks played an important role, they were employed to cross fire swept areas

whose crossing by day would have cost too much blood. In the future such attacks will be advantageous. Surprise attacks, carefully prepared, strongly supported and with limited objectives, participated in by the fire groups discussed above should be successful both by day and by night, in future wars, in stabilized situations.

The platoon leader can not lead his platoon from the rear. He does and will see too little. Before the attack is launched he can assign specific objectives to his groups but just before the breakthrough he must be forward, with his support (group), for from the forward position only will he be able to determine the next employment of his unit. Likewise, the company commander can lead his company from a rearward position only at the beginning of the battle. In position warfare the company commander must be well forward in order to coordinate the action of his shock troops and the supporting weapons in the shell torn, not easily observed terrain. In a war movement, in open terrain, a company commander can lead his company from a more rearward command post. In position warfare the commander must be at the decisive point at the decisive time. He must by personal example drive forward the attack. Obviously a disadvantage arises: the company commander loses temporarily, at least, the view of his whole zone. But in the terrain of position warfare he can not master his problem and the situation from the rear.

The rifle company soon separates into individual shock units, without connection. Because of this separation it can not drive on through a well organized position; it must be given a limited objective. As the companies break up into these small groups the danger of hostile counterattack is greatest. Therefore, it is necessary to employ additional forces from the rear at this critical time. Simultaneously with the forward displacement of the supporting fires the battalion commander must push forward his reserves, sending these through the forward companies and with objectives further into the hostile position. The elements passed through must be reorganized and prepared for further attack. Only thus, by continually renewing the forward elements, can the attack be driven into a deeply and thoroughly organized battle position.

A rifle company organized on the basis indicated would number about 120 men.

3 Platoons:

Each platoon consisting of 3 groups and a light mortar section—30 men.

Fire echelon of the company:

2 Heavy machine guns
Heavy mortars
Sharpshooters.

The question arises whether such a unit will be capable of combat after normal losses. The group can effectively function as a shock unit with but two operators for the light machine gun and two grenade throwers. But the heavier weapons must not long lie idle because of lack of personnel. Rapid replacement of personnel must be assured. It is perhaps suitable then to provide each company a fourth platoon, a replacement platoon. Similarly a replacement pool in the division is advisable. France has such an organiza-

tion today. Moreover, the replacements live with their organization and accustom themselves to the press of combat.

3. The engineer equipment for the attacking infantry will play an important role when the defender has reinforced his position. Terrain secure against tanks, obstacles and hindrances, artificial and natural, to the infantry advance, both in front of and within the battle position, must be overcome and removed.

As in the World War, there must be allotted to the infantry, engineer troops with means and material to assist the attack; means for overcoming and removing obstacles and blocks of all sorts as well as means for attack against fortified and organized areas: flame throwers, heavy demolition material and mines. The infantry itself must have organically assigned troops trained in engineer technique and who can execute the lesser engineer work. The training of a few soldiers for a few weeks in such work is wholly unsatisfactory for trench warfare purposes. With the increase in mechanization engineer missions increase in number and importance. With such a situation the placing of an engineer company, or similar unit, organically in the infantry regiment, seems a logical move.

4. Both the attacker and the defender will employ air units and tanks at the decisive area of the attempted breakthrough, often they will prove more effective against the attacker who must move in the open than against the defender who has prepared cover and camouflage. At the decisive area of the battle the air force of the defender must at least be neutralized, and this neutralization must be accomplished by a combination of air and ground forces. The neutralization of hostile (defense) tank units may not be possible in the early phases of the attack. While the tanks of the attacker are being hindered and stopped by obstacles, natural and artificial, in front of and within the defensive position and in some situations will be unable to participate in the combat, small tank units of the defender will be able to participate effectively in counterattacks. The antitank weapons of the attacker can seldom be brought forward so rapidly and so far in the difficult terrain of the battle position as to provide protection to the advanced infantry weapons. But these advanced elements must be able to drive on. Therefore, the infantry needs a light antitank weapon which, in any kind of terrain, can be brought forward quickly to provide protection for these forward infantry units. Suitable and desirable also would be the equipping of the infantry with mines (hand thrown) which will destroy the running gear of tanks. These mines should also be suitable for employment against hostile cover and obstacles.

IV

Mention has been made of the tasks of the air force in the breakthrough. Close cooperation between units of the air force and the infantry is essential. From World War experience, which has been confirmed both in Spain and in China, we know that combined air and ground attacks damage greatly both morale and matériel of the defender. Hostile reserves, held under cover, can be discovered early in their movement and attacked by the air units before these reserves intervene in the battle. To assure the greatest success of the infantry attack against an organized position, this attack must be coordinated in space and in time with attacks

against the hostile rear areas. In terrain difficult for tank maneuver and blocked by artificial obstacles of all kinds earthbound attacks can not always reach these rear areas at the decisive time. In such situations the air attack is of especial importance. Moreover, observation planes are of particular value in observing the advance of our own units and reporting their locations. An infantry attack which shall remain advancing must be observed by observation planes and supported by combat planes.

Often doubt is expressed as to the employment of planes in support of infantry as was done during the World War. Modern planes are too fast, 'tis said. Flying low and at great speeds the details of the ground battle can not be seen and effective action against small targets can not be taken. The ground defense has become too strong.

Without question the modern infantry support plane must be adequately armored. Then it can closely approach its objective. It does not need great speeds. Against hostile pursuit planes its own ground defense units can provide some protection. But, since at the decisive area the attacker must have air superiority, his own pursuit will be present to provide protection to these infantry support planes. The employment of these infantry support planes in no way causes a dispersal of the available combat planes, which, in general, must be employed as a unified whole. The breakthrough must be sought at a decisive area. The whole front of a prepared trench system can not be attacked with equal force. No country in the world today has the means with which to launch a successful attack along the entire organized front. Consequently, at the decisive area, a proportionately small number of combat planes will suffice to meet the demand for infantry support planes. These planes may perhaps be the sole means which can strike behind the lines against the covered assembly areas and approaches, both to attack and to block the reserves. *Tactical envelopment*. On the other hand, the air force alone striking at the hostile source of power, the *strategical vertical envelopment*, can not alone bring victory. The difficult infantry frontal attack and the air attack must be complementary.

CONCLUSION

Infantry seeking the breakthrough against a deep well organized trench system must be strongly supported by artillery and tank units. In addition, heavy infantry weapon companies, mechanized storm battalions, engineer units and combat plane units should be attached or in support. Without these means the infantry will confront a well-nigh insurmountable obstacle.

Modern infantry is composed of various elements, equipped with various weapons. The training and the achievement of the maximum combat efficiency of modern infantry are not simple matters. Only by the use of the latest and best equipment and weapons can infantry fulfill its mission most effectively. And these can not be most efficiently employed by the individual soldier or small units, all similarly organized. Today the maximum accomplishments rests with specialization. That is the trend of the time. Special tasks and missions require specialists for their solution. The uniform organization of days past can be no more.

From the specialists is built a well organized whole, brought to fullest efficiency under a single leadership.

The infantry, of all the arms, has held longest to its simple and uniform stamp. The picture of infantry on parade is a pretty one, a lovely symbol of the past. It shows uniformity but infantry today can not be so simply organized and equipped, it can not be a unit whose elements have the same mobility, the same training. Modern infantry is and must be a technical branch. Only with technical means can it solve its tactical problems, only with iron and steel can it make its superior morale decisive.

THE PREPARATION OF TANK ATTACKS

["La préparation des attaques de chars," by General A. Niessel. Condensed from *La France Militaire*, 4 and 5 December 1938.]

By MAJOR T. R. PHILLIPS, *Coast Artillery Corps*

Tanks have become an important combat factor and in all the large armies they occupy a major place. But one should not forget that the results to be expected of them do not depend alone upon their own qualities and upon the instruction of their crews; their success does not depend only upon careful coordination with the infantry for whom they clear the way and upon the artillery which supports them, but also upon an extremely careful reconnaissance of the hostile terrain. In Spain, tanks have been engaged many times and frequently in large numbers; nevertheless the results expected from them have not been realized because of lack of coordination with the other arms, and because reconnaissances have not been executed with sufficient care. When an unexpected obstacle is presented it forces the tanks to change direction at a reduced rate of speed. When this happens they often crowd into a narrow space while searching a passage, and successive waves pile up augmenting the confusion. If they are not then very heavily protected by the fire of friendly troops, serious losses are almost certain and repulse is probable.

A detailed study of the use of tanks in maneuvers shows that antitank guns are never completely destroyed by fire, without considering mines and other artificial obstacles prepared against them. In position warfare reconnaissance of the terrain and the enemy requires detailed study, but there is time for this. In war of movement the study is equally required but the time available is at a minimum and without it grave risks are run. In one large attack during German maneuvers in which two battalions of tanks were engaged, the ground reconnaissance seemed to have been as complete as possible during the time taken to capture the enemy outpost position. The attack debouched in perfect order when suddenly the whole left battalion, on a front of 600 yards, encountered an irrigation canal with vertical banks of a height to render crossing impossible. The tanks started along the obstacle seeking a crossing point and offering their flank and sometimes their rear to the fire of hostile antitank guns. This painful spectacle lasted several minutes. The ground reconnaissance had not been pushed far enough forward to see the canal. An aerial photograph of the terrain had been taken the day before. Examined with a magnifying glass, the canal could be seen, but no one had taken the trouble.

If there is time, minute aerial reconnaissance of the terrain should be undertaken, both visual and photographic. The tank commander, or one of his officers, should fly over the ground. From these reconnaissances an aerial map should be made with a scale of 1:20,000 or 1:25,000 showing, besides the obstacles found and the enemy troop locations, the limits of the zones of action of the tank units and their objectives. Copies of these maps given to the infantry, artillery, and aviation will permit the complete coordination of the efforts of these arms with the tanks. In addition, each tank attack should be accompanied by aviation charged with signalling every new or unexpected obstacle, natural or artificial.

Nor does all this relieve the tank commander from the obligation of reconnoitering minutely the hostile terrain and from obtaining from the infantry and artillery all the information which they have. If time presses and his orienters are engaged, he should at least study the terrain of attack from the artillery observation stations in liaison with the head of the observers and have seen personally the infantry commander for whom he is entering into combat.

It is also necessary for all the tank officers to have seen the terrain to be crossed, for a map study is not sufficient to indicate its nature. This terrain study, visual, by information from other arms, by aerial photographs, should be just that much more minute as the depth of the prospective attack increases.

All these operations require time. To gain it requires that the officers and reconnaissance personnel get on the ground in advance of their units in much the fashion now practiced by the artillery. Artillery orientation officers precede their units some distance and choose emplacements and observation posts, and commence to establish liaison. Only an extensive tank movement will allow the time to gain sufficient contact with the infantry and artillery to obtain all the information necessary. The smallest details are important for tank orientation: the existence of open ground or of steep slopes; swampy ground; heavily wooded spots; ditches; the general nature of localities; all these are very important for tanks. Besides, the infantry and artillery, having already gained contact with the enemy, may have observed the preparation of artificial obstacles, fields of mines, or nests of antitank guns. These arms, continuing to gain information, the establishment of rapid and sure liaison with them is equally necessary to assure its transmission up to the last moment before the tank attack.

It will not be possible to take all these measures if one intends to pass directly from the tank approach march to the attack. It is thus indispensable to keep the tanks in a position of readiness for a varying length of time in order to have time to execute fully the indispensable reconnaissances and liaisons.

These precautions can no more be neglected than were similar ones in the past in preparation for large cavalry actions. These latter only gave the results hoped for when they were properly prepared. Today, still, an infantry attack that has been stopped, can dig in and start again after a new artillery preparation, the arrival of reinforcements, or favorable incidents in neighboring sectors. But a tank attack that has miscarried, particularly under fire of antitank guns, will always lead to heavy losses and will require that the units

taking part be withdrawn to the rear to be put in order and resupplied.

Thus, in addition to the offensive spirit which must animate the tank officers, should be added cold reason and methodical preparation and conduct of their attacks. As for the commander who calls upon the tanks to aid the infantry, he should never forget the time required for preparation of a tank attack, if it is to succeed, and in consequence give them the time they need. As for the infantry, it should realize and have the patience to await the preparation of a tank attack, just as it has learned to await artillery fire, to prevent useless losses; but it should not forget that it should do everything to facilitate the action of the tanks, aid them with all its means against antitank guns and profit without loss of an instant from every advantage they gain.

Contrary to the claims of certain unreflective innovators, if tanks have become an important factor in combat, they alone are unable to bring success. The combination of the efforts of all the arms is indispensable to assure victory and is always for the benefit of the infantry and with a view to its success that the combination should act.

FRENCH PRINCIPLES FOR THE EMPLOYMENT OF MECHANIZED AND MOTORIZED UNITS AND THE DEFENSE AGAINST THESE UNITS

(PART I)

["Französische Grundsätze über Verwendung mechanisierter und motorisierter Einheiten und der Abwehr dagegen." Condensed from *Die Kraftfahr-kampftruppe*, July 1938.]

BY CAPTAIN H. N. HARTNESS, *Infantry*

The French *Instructions for the Employment of Large Units* of 1937 has been studied by the German author (s) and from it have been consolidated those principles (French) applying to motorized and mechanized units.

As stated in the *Instructions* the purpose of the publication is to:

- (1) Lay down the possibilities of employment of modern forces and means;
- (2) Determine the principles of their employment;
- (3) Indicate general principles for the leadership of the newly created motorized units; and
- (4) Complete in many details the *Regulations of 1921*.

NEW POSSIBILITIES OF MOTORIZATION AND MECHANIZATION

The development of modern motor and mechanized vehicles and means of communication can and will accelerate movement to and on the battlefield.

This development makes possible:

- (1) The displacement quickly and to great distances of strong forces;
- (2) The protection of motor movements by mechanized units;
- (3) The acceleration of all phases of the attack and of the defense by the employment of armored vehicles;
- (4) The acceleration of supply to units, both large and small.

THE INFLUENCE OF TERRAIN ON THE EMPLOYMENT OF MOTORIZED AND MECHANIZED UNITS AND ANTITANK MEASURES

Terrain must be studied from the map, from aerial photographs and by ground and air reconnaissance. Only then can a clear picture of the terrain be obtained, a full utilization of its advantages and a mastery of its difficulties be achieved.

Mountainous terrain, rivers and large wooded areas hinder the movement and development of large commands.

In slightly rolling, open country with few obstacles, the unimpeded movement and utilization of motorized and mechanized units are possible. But absolutely open terrain is little suited to armored vehicle employment. Excellent fields of fire are offered the defender.

The natural obstacles offered in a wooded, hilly, broken terrain hinder the movement and limit the employment of mechanized vehicles, perhaps will not permit employment. Moreover, since a mechanized unit employed in such terrain must operate within a small zone, the morale destroying effect of the armored vehicle is reduced.

Natural terrain obstacles should be reinforced, when necessary. Artificial obstacles must be prepared and executed to assist the active antitank defense.

RECONNAISSANCE AND SECURITY

Reconnaissance

Today's motorization and communication developments demand that reconnaissance be executed at greater distances, the greater the unit, the greater the distance.

Security

1. *General principles.*

The increase in the fire effect of weapons, the advances in mechanization which permit mechanized elements to strike deeply, the development of motorization, which permits the rapid displacement of strong forces, and the increase in speed, the combat effectiveness and the radius of action of airplanes have given security a greater meaning than ever, with the result that security must be separated into a ground security and an air security.

The terrain must be utilized to its maximum for security, troops must be concealed from hostile observation and protected from hostile fire effects. Above all they must be protected against thrusts by hostile mechanized units.

Security can only be considered as assured when the troops are protected against the attack of hostile mechanized units. Consequently, such protection must be taken very strongly into consideration when the location of security forces is decided.

The most effective obstacles against armored vehicles are water courses and lakes. Along these, obstacles can easily be laid, even though swimming tanks are used. A careful defense at those areas where swimming tanks may cross will make such crossing extremely difficult.

If there be no such natural obstacles as water courses and lakes, other natural obstacles such as woods, steep slopes, swamps and the like must be utilized.

2. *Distant security.*

Distant security must be guaranteed against rapid moving hostile troops. Distant security will be a common task of the air and of army cavalry. For such purposes reconnaissance battalions or other detachments, especially made up of motorized and mechanized units, will be formed.

How far to the front these detachments will push depends essentially upon the terrain, the situation and the strength of the unit being protected. They should be pushed forward to areas easily defended, especially to those favorable for defense against mechanized units, at which areas the security detachments can begin executing delaying action.

3. *Close security.*

Close security can be considered as guaranteed only when the troops are protected in front, flank and rear against surprise, and especially against surprise attacks from armored vehicles.

Security during the rest: The mass of the troops bivouac protected by obstacles, whenever possible, utilizing every natural hindrance to protect themselves against mechanized attack.

Security on the march: The advance guard consisting of the necessary infantry and engineer units, reinforced by antitank elements, armored vehicles and by artillery, provide security to the front. The advance guards have the continuing mission to form a part of the antitank defense of the entire command. For this purpose antitank weapons will be echeloned along the entire march column, these weapons advancing in leap-frog fashion so as best to execute antitank defense.

In general, rear guards will consist of a mixed force of motorized and mechanized troops, reinforced by antitank elements. During the retreat or retirement the rear guard moves by bounds. Whenever possible these bounds should be made from natural obstacle to natural obstacle.

The task of flank guards is especially important because of the great radius of action of armored vehicles which increase the danger for the flanks of the moving column. Flank guards should consist of elements of all arms, and should be adequately reinforced by antimechanized weapons.

4. *Close-in security.*

Neither the measures indicated for distant nor for close security can protect all elements of the entire command from a close-in thrust by mechanized units.

Consequently, on the march, during the rest and in battle, measures must be taken for the close-in security of the unit, and for this purpose the employment of antitank weapons is necessary. This employment must be assured in the shortest possible time and, based upon the situation, must have been prepared beforehand. Camouflage, cover, obstacles and hindrances should also be employed for this close-in security.

MARCH AND TRANSPORT

1. *General principles.*

The movement of large units can be simultaneously a march and a transport movement, for example, when the

motorized elements move under their own power and the foot and animal elements are transported by rail.

In order to gain the maximum efficiency from the means of transportation, especially of motor transportation, the movements must be carefully planned and executed.

Because of modern motorization the importance of roads for strategic transportation has increased enormously. On the march, organic units should remain together; both by day and by night the columns should be secured against hostile air reconnaissance and espionage. Stress must be laid upon camouflage discipline. Marches by night will be made frequently. Routes and objectives must be kept secret.

According to the tactical situation large units will be organized into march groups; each group should include units of the same rate of march. Insofar as possible routes should be assigned so that the minimum possibility of cross-traffic exists.

2. March on roads.

To facilitate the march the commander should permit each march group commander to set his own rate of march, insofar as such latitude does not interfere with the necessary traffic regulations.

3. March of large motorized units.

Large motorized units as a rule march with their mass on roads. Often transport units of the general army reserve will be attached for the march.

For a march behind the front the march order of large units must take into consideration the special traffic regulations applying to the roads over which the units will march. In order to be able to unload rapidly and begin the development quickly, the large motorized unit should be assigned several routes of advance.

In organizing his march groups the commander must always consider which elements will be, or will be expected to be, employed first. The main body of the large motorized unit can move through an area or into an area only, which has been and is protected.

4. Advance over terrain.

Repeated air attacks, artillery fire or the attacks by mechanized units will force the large motorized unit to leave the roads and move overland. When forced to leave the roads development begins.

5. Railroad transport.

Railroad transport is primarily suitable for long moves, but can well be employed by the large motorized and mechanized units for the transportation of a part of this unit while the remainder moves by road.

6. Motor transport.

Motor transport can utilize most of the road net. Consequently, the change of direction of the motor transport movement can be made quickly.

An adequate road net offers various possibilities for the changing of direction and permits those units transported by motor—

a. To be unloaded near the area in which they will be employed, and

b. permits their supply to be brought close to the area of their employment.

The capability of the motor transportation will depend to a great extent on the kind and condition of the roads and upon the traffic regulations in force in the area.

Motor transportation is more easily camouflaged than rail transportation. It has the disadvantage that it clutters up the road and demands close supervision. The danger also exists that on long marches the large unit will become somewhat separated.

Ordinarily most of the combat troops of the large units and of the general army reserve, which are themselves not equipped with motor transportation, can be transported by motor. Motor transportation has, however, a lesser capacity when animals must be transported.

Motor transportation can extend or supplement rail transportation. Because of the development of motorization this connection obtained from the end point of the railroad continued on by motor is a means of transport recommending itself strongly.

TANKS IN THE ATTACK

1. The approach and gaining of contact.

The approach march begins as soon as hostile air attacks, artillery fire or attacks of armored vehicles force the command to leave the road. Protection of the troops from the front against mechanized vehicles is provided primarily by the antitank weapons and tank elements which have been given to the advance guard and whose mission it is to hold off the hostile tanks at the greatest distance possible. It will often be advisable to leave small rear guards in rear of the marching column and at water courses or defiles in order to block off an enemy attempted attack against the rear of the column.

The approach march ends upon contact with the enemy. The armored vehicles favor and accelerate, because of their armament, their armor and their speed, this gaining of contact. Moreover, they make possible a saving in the employment of infantry. Therefore the attachment of tanks to security elements such as advance guards, is generally highly desirable. With such attachment of tanks the fault of re-allotting these in small groups to small units must be avoided.

2. Tanks in the attack.

For the attack there will ordinarily be an additional allotment of means in which tanks will almost always be included, for tanks are especially suited to assist the infantry in overcoming resistance, which in the course of its attack it runs into.

In the attack, tanks will, as a rule, be employed in large masses on a broad front and echeloned in great depth. Tanks have great moral and matériel destructive effect, they assist the infantry advance and cause the hostile artillery and anti-tank weapons to disperse their fires. The commander orders the time at which the mass of the tanks shall be employed. Sometimes they will be employed at the beginning of the attack, at others only after the seizure of one or more initial objectives.

Because of their speed tanks can be held in readiness sufficiently far back from the line of departure as to be out of range of the hostile artillery fire.

The employment of the tanks is based on these two principles:

a. Tanks are attached to infantry in order to accompany the infantry. This accompanying mission can be executed by all kinds of tanks. For the duration of such a mission the tanks will be designated as "accompanying tanks," and

b. Tanks may be given to the commander of the large unit, to remain under his direct command. Such employment is indicated when the tanks shall be employed in combat in accordance with the will of the higher commander. During the time tanks are so allotted they will be designated as "tanks under the command of the ----- commander."

In the first instance mixed units consisting of infantry and tanks will be formed. But such combination should in no way produce a disruption of the organic units. In the second instance the tank units receive from the higher commander exact and usually limited objective missions. By such assignment of missions the commander of the large unit coordinates the advance of the tanks with the artillery fires and with the combat of his other units.

The higher commander must always bear in mind the possibility of counter-thrusts by hostile mechanized units and must provide measures to meet such counterattacks.

Every attack should be preceded by a preparation. The allotment of tanks and additional artillery makes possible a shortening of the time for this preparation. In exceptional instances this preparation can be dispensed with.

In all phases of the battle the commander exercises his influence primarily through the employment of his reserves (infantry and mechanized troops). He determines the location of these reserves and directs their advance by bounds so that they can be employed at the time and at the place where the decision is sought.

3. Cooperation between infantry and tanks and support of the artillery.

Infantry must bear the main burden of combat. Infantry, supported by the fire of its own heavy weapons and artillery, and, when feasible, by tanks, either accompanying or immediately preceding, and by combat aviation, overcomes the enemy, occupies the terrain and defends it. Infantry must have antitank weapons.

Capabilities and Missions of Tanks

Tanks are armored vehicles whose speed varies with their individual characteristics. Their mobility and speed can be materially reduced by natural or artificial obstacles.

Tanks are capable of creating their own routes through certain passive resistance, of laming active resistance and at close range, of destroying such resistance. Under favorable circumstances tanks can temporarily occupy terrain, but never are they alone able to occupy and hold terrain.

In general, tanks alone, even when employed in mass, can not break through a strongly organized position without the assistance of other arms.

There are various types of tanks, differentiated one from the other by their speed, mobility, armor, armament and means of communication.

The following missions can be assigned tanks:

(a) To accompany infantry, and cooperate more closely in combat with the infantry, to attack the hostile automatic weapons which hinder the infantry advance.

(b) To push out rapidly ahead of the infantry and its accompanying tanks to attack infantry objectives in rear of the initial objective.

(c) To attack hostile tanks.

(d) To drive through the hostile position, once the forward elements appear to be sufficiently shaken, and to strike the rearmost defense weapons and higher staffs.

Should serious hostile resistance be beaten down and exploitation be in order, tanks can well form the basis of mixed mechanized units to be used in the exploitation. These units should be composed of all suitable available mechanized forces, such as:

Motorized reconnaissance battalions;
Motorized brigades of the cavalry divisions;
Light mechanized divisions.

The slow tanks, unsuited for employment on such distant missions, should be employed as accompanying tanks with the pursuing infantry.

Rapid tanks, equipped with radio equipment, will form a mobile, strong combat means in the hands of the higher commander.

Support of Artillery

A prime mission of the artillery is the support of the infantry and tanks. In the attack it fires preparations and supports the attack when it is launched. In the defense it delays and destroys the hostile attacking troops and participates in the close defense of the position. In both instances it fires upon hostile artillery and mechanized vehicles.

For combat purposes, the artillery will be organized into groups, each of which will be given definite, positive missions, such as direct support and protection of the infantry and the tanks.

In detail, the cooperation between the artillery and infantry and tanks in the attack is as follows:

(a) Close support of the forward infantry and tank attack waves, this support provided from positions as close to the jump-off line as possible and continued against new appearing resistance as the attack progresses.

(b) Protective fire against more distant area targets from which the enemy can bring effective automatic and antitank fire on the attacking troops, and from which he has good observation of the terrain.

(c) Counterbattery. The close-support and protective fires are provided by close-support groupments and "center of gravity" groupments. Counterbattery is the mission of special groupments. The artillery employment is based on the kind and characteristics of the units forming the forward elements of the attack troops. If the attack be launched without tanks or with accompanying tanks only, the troops will be supported by close support groupments. With such support the artillery fire will be placed close in front of the landing assault waves but far enough out to avoid striking its own infantry, and if accompanying tanks are used, the artillery fire support must be coordinated with their activity.

If "tanks under the command of ----- commander" precede the infantry and accompanying tank units, the close support artillery fire will be placed in front of these forward tanks and so placed that these can utilize their own weapons and speed without fear of being fired into by supporting artillery.

In a situation such as indicated in the preceding paragraph the artillery groupments providing close-support fires and protective fires will lay a sort of box barrage within which both the preceding tanks and the infantry and accompanying tanks will advance by bounds.

The artillery must be so employed that when and if the "tanks under the command of ----- commander" (preceding) no longer cover the infantry and accompanying tanks, these latter groups must receive close support and protective fires from the supporting artillery. In every instance, the artillery must be prepared to provide support to the infantry and its accompanying tanks when they reach and make the necessary halts at the various objectives.

Completing the Battle

In the exploitation, as soon as the situation permits, mechanized elements, supported by combat aviation, must be set in motion to destroy the enemy. These attack march columns and supply columns seek to block the retreat at defiles. Gradually, other units, cavalry and motorized troops, come up and hold the enemy at these areas and thus permit the real destruction.

Attack of a Position

The attack against a strong position is materially aided by the employment of large tank units. It may be advisable to hold the tank units in reserve initially in order to launch them later deep into the hostile position after the hostile artillery fire has been dispersed, beaten down and become less effective.

TANKS, MECHANIZED AND MOTORIZED UNITS DURING THE DEFENSE

The commander exercises his influence in the defense principally in the use of his artillery, combat aviation and infantry reserves, reinforced with tanks.

Should the enemy break into or break through the defensive position, the defender employs local or general counterattacks.

Tanks, because of their morale and matériel destroying effect are especially suitable for use in the counterattack.

If sufficient space is available and the necessary forces are present, it is highly desirable to push mixed detachments (cavalry, mechanized and motorized units) beyond the combat outposts.

In delaying action, cavalry and mechanized and motorized troops combined with artificial obstacles are of especial value. It shall be their mission to maintain contact with the enemy, to protect the withdrawal, both from frontal and flank attack of the enemy, to harass the enemy and when he advances to strike him.

ANTITANK DEFENSE

1. General principles.

In a war of movement as well as in position warfare, tank mines shall be employed to block specified terrain areas against tanks.

When the enemy attacks, defensive fires provided by the artillery, infantry weapons and antitank guns must be placed in front of the main line of resistance. These fires should be thick, deep and gapless. The position chosen for defense should be one protected against mechanized attacks by natural obstacles, when possible, or by a combination of natural and artificial obstacles.

One of the missions of outposts is to protect the troops in the battle position against mechanized attacks. Therefore, it is advisable to reinforce the antitank defense means of the outposts while the battle position is being organized.

The detachments pushed out beyond the outposts must be reinforced with antitank weapons.

In the defense plan, measures to be taken against tank or mechanized attacks must be specifically delineated.

Antitank defense must be provided throughout the battle position. Participating in this defense will be combat aviation, cavalry, mixed detachments of motorized and mechanized units and artillery.

As soon as hostile tanks come within range of the outposts they must be engaged by the antitank guns and artillery of the outposts.

The decisive phase of the defense battle is reached when the hostile tanks near the main line of resistance. Therefore the fire plan must provide that the fires of the antitank guns and the artillery and the natural and artificial obstacles produce the maximum effect.

Defense tank units are held in readiness to strike the hostile tanks when their initial attack has caused dispersal and confusion.

In the protection of flanks and rear, consideration must be given the radius of action of modern mechanized vehicles.

During the entire battle the artillery must strive to prevent the advance of and to destroy the hostile tanks.

Especially stressed is the necessity of reinforcing the terrain. When possible the position is located behind a natural tank obstacle in order to prevent a surprise tank attack.

The defense is organized in depth, with several positions one behind the other. The great range of modern artillery and the speed of modern mechanized vehicles require the spacing of these positions at greater distance than was formerly done.

2. Organization of the antitank defense in the Army Corps.

For the attack the antitank defense must be prepared as a unit under the immediate direction of the Corps Commander. It is advisable that reserve division antitank weapons be employed in order to provide depth to the antitank defense. In the defense especially favorable tank approach avenues are blocked. The commander checks the fire plan for those areas where tank attacks are to be feared. As soon as an attack is imminent reserves are ordered to their assembly positions, their antitank weapons are placed in position.

3. Antitank defense in the infantry division.

During the Attack

All command posts and similar locations must be protected against mechanized vehicles.

As soon as contact with the enemy has been gained, the reconnaissance battalion holds itself in readiness to seize a favorable line, one which can be held with few forces against a mechanized attack.

The approach march will be made by bounds from area to area, at each of which antitank defense is favored. Advance under cover and in such formation as permits rapid approach and protection against mechanized threats.

For the attack the division will ordinarily be reinforced by antitank elements.

The attack order specifies the organization of the antitank defense.

The purpose of the antitank defense is protection of front, flanks and rear of the division during all phases of the attack and is accomplished by:

- (1) Pushing the reconnaissance means far and fast and making use of the information provided;
- (2) Utilizing a combination of natural and artificial obstacles and the fire effect of combat aviation, artillery, antitank weapons and mines;
- (3) Employing tanks held in reserve.

The active antitank defense of the division by organic and attached weapons is accomplished by:

- (1) The artillery with the division;
- (2) The antitank units of the division;
- (3) The antitank means of the troops;
- (4) Tanks allotted the division for the attack.

The antitank defense must be a defense in depth.

In general the antitank defense will be echeloned as follows:

- (a) A mobile defense echelon, which closely follows and accompanies the infantry in order to provide it the greatest amount of protection possible.
- (b) A second echelon which shall provide defense against tanks which have broken through the forward defense echelon. This echelon will primarily protect the artillery, the command posts and service elements.
- (c) A defense echelon composed primarily of the artillery and its antitank guns.
- (d) When the situation dictates, augment the defense indicated above by antitank defenses and obstacles on the flank. (Flank division.)

It is the responsibility of the division commander to determine the antitank defense measures to be taken, so that thorough, deeply organized protection is obtained. For this purpose an antitank defense plan is prepared.

During the Defense

Antitank defense during the defense serves the same purpose as in the attack and has the same means.

Antitank defenses will be echeloned throughout the depth of division sector, and, as a rule, will be established as follows:

- (a) A defense echelon with the outposts;
- (b) A forward primary antitank defense zone, whose fire will be coincident with the artillery defensive fires;

(c) Antitank defenses, active and passive, within the position, especially strong where tank approach is most favorable;

(d) An antitank defense forward of the artillery, the command posts and service elements, to give protection to these elements;

(e) An antitank defense provided primarily by the artillery and its own antitank guns.

These antitank defense areas cannot provide a gapless defense. They must block those terrain areas not protected by obstacles, that is, terrain weak against tanks. Further protection of the flanks is secured by the erection of obstacles and blocks, covered by fire.

If additional antitank weapons are attached to the division and these are held in reserve, they are employed against attacking tanks.

The erection of complete antitank defenses requires a long time and much matériel. Therefore speed is essential, continuous maintenance imperative.

(To be continued)

RUSSIAN PRINCIPLES FOR THE EMPLOYMENT OF TANKS AND MOTORIZED UNITS AND THE DEFENSE AGAINST THESE UNITS

(PART I)

["Russische Grundsätze über den Einsatz von Panzer- und motorisierten Verbänden und der Abwehr dagegen." Condensed from *Die Kraftfahrkampfttruppe*, November 1938.]

BY CAPTAIN H. N. HARTNESS, *Infantry*

PRINCIPLES OF LEADERSHIP

Infantry, in close cooperation with artillery and tanks decides the issue of combat, by decisive, aggressive conduct in the attack and by maintaining its position in the defense.

Mechanized units, consisting of tanks, self-propelled artillery and infantry in motor vehicles are capable of executing independent missions, not only widely separated from other elements but also in close cooperation with other elements (divisions, corps, army). Mechanized units have great mobility and tremendous fire power and shock action. The basis of their attack is the tank, strongly supported by artillery. Both the movement and attack of these units must be supported by air forces.

Modern technical means of combat permit the simultaneous destruction of the hostile force throughout its depth. The possibility of rapid reorganization, surprise envelopments and turning movements, the occupation of terrain in rear of the enemy and attacks against his lines of communication has been increased.

The increase in motorization, the increased speeds of troop transportation and movement and the great number of various weapons make the service of security particularly important and demand its continuity in all phases of action.

Modern combat and technical means (especially armored vehicle units) offer a continuous threat to the lines of communication and supply system. Provision for the

continuous protection of the lines of supply is an indispensable requisite for victory.

The division reconnaissance battalion executes both distant and close-in reconnaissance. It will precede its division by 16 to 19 miles and in turn will push patrols (armored reconnaissance cars supported by motorized infantry) beyond its own main body. Mobile observation posts in motor vehicles will follow the forward patrols.

Against an enemy in a defensive position an infantry battalion, reinforced by artillery and tanks, may be employed for reconnaissance. (Reconnaissance in force.)

The modern means of beating down an enemy (tanks, air force and mechanized units), when employed in large numbers, provide the possibility of striking deep against the enemy, cutting him off, encircling and destroying him. This will be achieved by an envelopment or breakthrough by tanks and motorized infantry and attack by air units, mechanized units and cavalry against retreating enemy forces.

The organic tank battalion of the division provides the "Infantry close support tanks" (accompanying tanks).

In the attack this tank battalion will ordinarily be attached to infantry, a company of tanks here, a platoon of tanks there. In the defense, however, the battalion is held ordinarily as a whole under the division commander for employment in counterattack or against hostile tanks.

The tank units to be used on distant missions will be attached, according to the situation, to corps or division commanders.

Ordinarily a tank attack is launched in waves.

EMPLOYMENT OF TANKS

General Principles

Although tanks have great mobility and tremendous fire power and shock action, in the utilization and employment of this combat means the technical limitations of the matériel, the physical endurance of the personnel and supply and maintenance must be carefully considered.

Artillery and tanks assist the infantry in the attack by beating down machine guns and other hostile weapons. When tanks are employed it becomes the primary mission of the artillery to beat down hostile antitank guns. Tanks combat primarily the hostile machine guns.

Tanks attached to combat units will be employed to break through the hostile lines and destroy his reserves, artillery, command posts and supply installations. This mission is in addition to that of initially assisting the advance of the infantry.

Tanks Must Be Employed In Mass

In the defense tanks will be employed in counterattack against tanks, infantry and cavalry. Artillery must support the tanks.

Tanks In Meeting Engagements

Advance guards shall act independently, boldly and decisively and defeat or destroy the hostile advance guards or advanced elements, before the main body can develop. For this purpose the advance guard will be reinforced with tanks.

If the hostile advance guard is caught undeveloped it shall be attacked in flank and rear by tanks (of the advance guard) supported by artillery and infantry. For this purpose the artillery of the advance guard shall go into action immediately, even though its position be not particularly good and its reconnaissance be not completed. It shall fire upon those hostile units creating the greatest hinderance to the tank and infantry advance.

The tanks break through any hostile security troops and attack the advance guard in flank and rear. The infantry exploits this attack. The hostile advance guard shall be destroyed before it can be reinforced.

If the commander recognizes that the enemy is already partially or wholly developed, he attacks, directing his decisive attack against the hostile exposed flank. While the advance guard fixes the hostile force in front, tanks and mechanized units are directed against the hostile flank.

Should the enemy withdraw or retreat, the follow-up and pursuit must be relentless. In order to encircle the enemy, cut off his line of retreat and fully destroy him, tanks and motorized troops should be employed.

Tanks In the Attack

a. General Principles.—An attack against an enemy in position demands the employment of the greatest possible strength and means, and the assurance of an overpowering superiority at the decisive area. The attack shall be launched with the purpose of driving through the entire position. This purpose will be achieved by employing air units, artillery, smoke, tanks with "deep objectives," by the attack of infantry with accompanying tanks and by the employment of mechanized units deep against the rear of the enemy. By such means will the enemy, throughout the depth of his position, be fixed, enveloped and destroyed.

In the preliminary reconnaissance it is especially important to locate tank obstacles and the positions of antitank guns.

Of particular importance are the aerial photographs (1:5000) to be provided primarily to tank units on "deep objective" missions.

Reconnaissance should determine the trace, the depth and the kind of obstacles, detours and areas which have not been gassed.

Exposed flanks should be enveloped or turned. Tanks and air units facilitate the envelopment. In the envelopment of an exposed flank, the "distant objective" tanks drive against the main lines of communication and against the hostile rear. The main forces follow the tanks.

Should the enemy offer no exposed flank, a penetration and breakthrough must be sought. The attack of infantry, "distant objective" tanks, air units, supported by artillery shall destroy the enemy and seize his matériel.

For the main effort of the attack a decisive superiority must be provided. The zone assigned the decisive effort will depend upon the means available, the location and amount of antitank guns in the hostile position, as well as the location and amount of obstacles, both natural and artificial.

In an attack against an enemy in "deployed defense" an infantry assault battalion will be supported by an artillery battalion and a tank company or by two artillery battalions. The battalion will physically cover a frontage up

to 600 meters. With a greater amount of artillery and tank support this frontage may be increased to 1000 meters.

The assault elements of an infantry division will be assigned zones which taken together will amount to 2000-2500 meters; when reinforced by a regiment of artillery and a battalion of tanks these zones may be increased to 3000-3500 meters. But the zone assigned the division as a whole may, as a maximum, be twice as broad as the total width of the zones assigned the subordinate assault elements of the division; that is, although the assault elements occupy zones totalling 2500 meters, the maximum zone of the division may be 5000 meters broad.

Elements participating in the decisive attack and those confronting especially strong hostile defensive areas are reinforced by heavy artillery, tanks and other elements from army reserve.

Of especial importance to the attacking units is the support of engineers (pioneers). These increase the speed of the attack of both tanks and infantry. The primary missions of engineers in supporting tanks are:

- (a) Continuous engineer reconnaissance of the terrain and of the hostile defense system,
- (b) Camouflaging troop assemblies,
- (c) Construction and erection of means for crossing obstacles during the attack (ladders, foot bridges, mats),
- (d) Water supply,
- (e) Removal and overcoming of obstacles and demolitions,
- (f) Construction of roads and bridges.

Especially stressed is the necessity for good radio communication to make possible the leadership of mobile forces operating deep in rear of the enemy defensive area. Radio assists the cooperation of the various arms during combat.

During the employment of "distant objective" tank units, a liaison officer with radio equipment shall remain with the corps commander and a member of the corps staff shall follow the operations of the tank units from an observation plane.

If there be but one "distant objective" tank group operating with the corps, the artillery support for this group will ordinarily be provided by the corps artillery. Should, however, there be sufficient tanks to provide two "distant objective" tank groups the corps commander will direct their support by divisional artillery. For this purpose the divisions will receive artillery reinforcements.

In the attack order will be included:

- Length of the artillery preparation
- Time of attack by the "distant objective" tank units
- Time of infantry attack.

In calculating the time of attack consideration must be given to the time required to prepare the effective cooperation of the infantry, artillery, and tanks.

b. Employment of "Distant Objective" Tanks and of Accompanying Tanks.—The employment of "distant objective" tanks to break through the entire depth of the hostile defenses is of decisive importance. The choice of the area for breakthrough and the measures of support for the "distant objective" tank units depend primarily on the

strength of the hostile antitank fire, on the presence of tank obstacles and on the terrain.

The mission of these "distant objective" tank units is to break through to the rear of the hostile position, to destroy his reserves, his command posts, the main artillery groups and to cut off the line of retreat of the mass of the enemy.

Ordinarily it will be found advantageous to time the attack of the "distant objective" tank units so that the infantry with its accompanying tanks, when it reaches the hostile main line of resistance, can utilize to the maximum the confusion caused by the passage of the "distant objective" tanks. A decrease in distance between the rear wave of the "distant objective" tank units and the advanced infantry and accompanying tank elements makes it impossible for the enemy to reorganize his fire system in time to meet the infantry attack effectively.

The infantry attack is made simultaneously with the accompanying tanks along the entire front.

When the hostile battle position lies in terrain unfavorable to tank attacks, the infantry attack, supported by artillery and accompanying tanks, shall precede that of the "distant objective" tank attack. In such instances the infantry seizes the hostile forward position and opens routes through the tank obstacles and unfavorable terrain for the "distant objective" tanks, which in turn utilize this advantage, pass through the infantry and drive deep into and through the hostile position.

A tank battalion in a "distant objective" tank unit attacks over a front of from 300 to 1000 meters. The front depends on the terrain, the artillery support and the depth of the attacking battalion.

If the exposed flank of the hostile position is enveloped the "distant objective" tank units will be employed against the hostile rear.

Although such an attachment will be out of the ordinary, should an air force unit be attached to a corps, this air unit will be employed to block or delay reserves and to attack troops seeking to escape. Provision must be made for the easy recognition of both friendly infantry and tank units by this air unit.

The primary task of the division commander is the assurance of cooperation between the infantry assault echelons, the tanks and the close support artillery.

At least two infantry regiments will provide the assault echelons of the division in the attack. These will be supported by the mass of the divisional artillery and by all the artillery attached to the division. When necessary, the division staff prepares an attack time table for the infantry, artillery and tanks.

During combat the division commander concentrates the fire of all his artillery on decisive areas. A success will be exploited by the employment of reserves, mobile elements of the reconnaissance battalion and other means not yet employed.

Ordinarily the regiment attacks with two battalions in assault, one in reserve. In small zones, regiments will attack in column of battalions.

At the decisive time of the conflict, when the assault echelons have penetrated the hostile position, the reserve of the regiment should move to the attack from the flank

of the assault echelon and bring the decision. Close support artillery supports this attack.

The regimental commander plays a decisive role in battle. It is he who has immediate reserves with which to reinforce and assist the assault echelons.

The advance of the reserves must be provided artillery and tank support.

It is the mission of the regimental commander to protect the advance of his assault echelons against tank attack. For this purpose he uses the tanks attached to him as well as the battalion and regimental artillery (in support or attached).

c. Cooperation Between the Infantry and Artillery and Tanks.—Artillery and tanks shall facilitate the advance of the infantry to close (bayonet) combat by preventing the enemy from raising his head and defending effectively against assaulting infantry.

Tanks follow closely the artillery fire or to within reasonable distances of the areas of artillery concentrations and assist the attacking infantry by beating down hostile strong points and machine guns. Against camouflaged antitank guns the tanks should be supported by artillery firing both explosive and smoke shell.

When an adequate number of accompanying tanks is present the primary mission of the close support artillery is the destruction of the hostile antitank system.

With an insufficient number of accompanying tanks or when none is present, the primary mission of the artillery is the support of the infantry attack.

Missions of the artillery in the support of the tank attack:

- (a) During the artillery preparation:
 - Counterbattery of hostile artillery;
 - Destruction of known antitank guns;
 - Concentrations on probable assembly positions of antitank weapons;
 - Destruction or neutralization of hostile observation posts, of strong points, especially those of concrete construction and particularly dangerous to the tank attack;
 - Neutralization of the machine-gun system in areas where tanks will not attack or which are not accessible to tanks.
- (b) During the attack of the "distant objective" tanks:
 - Fire support to eliminate or at least decrease the effect of antitank guns;
 - Neutralization of hostile batteries firing for the first time or from different positions.
- (c) During the attack of the infantry and its accompanying tanks:
 - Facilitate the advance by neutralizing the antitank defenses and machine guns;
 - Accompany the attack by fire until the enemy's resistance is destroyed.

With 30 to 35 guns (less long range artillery) on a one kilometer front and with one or two tank battalions present with each division, the preparation can be reduced to a period of 1½ hours. With insufficient tank support the artillery preparation should last longer, up to three hours, and when

the enemy has constructed a very strong position an even longer preparation is necessary.

There are situations (for example, when surprise is sought or when the enemy position is but hastily organized) in which a short preparation of 10 to 15 minutes on the main line of resistance and the presumed antitank defenses is suitable. But strong tank elements and artillery should be present. Under such a condition the advance of the tanks should be preceded by an artillery barrage.

If the preliminary artillery preparations have been made during the afternoon before, the preparation may be fired during the hours of darkness and the infantry and tank attack launched at daybreak. The night artillery preparation will be fired against the presumed antitank defense areas, against centers of resistance, reserves and command posts.

The artillery support for the "distant objective" tanks is best assured by barrages along and throughout the depth of the hostile antitank defenses. The lifting of fires will be determined by the actual speed of the tanks in the given terrain.

Protection to the tank attack is provided by the employment of an artillery battalion to each 300 to 400 meter front. In addition to the barrage, concentrations or a combination of barrage and concentration may be of special value. Concentrations should be employed when the assembly areas of antitank guns are definitely known. Should the system of hostile antitank defense be unknown, the barrage fire is the better to use.

In every instance the tank attack against the hostile main line of resistance must be supported by artillery.

In an attack by tanks against a hostile exposed flank, support by artillery is essential, since motorized antitank weapons of the defender will be able to establish an antitank defense system.

Upon the completion of its mission of supporting the "distant objective" tanks, the artillery which was on this mission supports the attack of the infantry and supporting tanks.

Accompanying tanks receive artillery support as follows: The close support artillery of a particular infantry unit places its fire in front of the tanks accompanying that infantry unit, and primarily on known or presumed antitank defense areas.

Tanks, companies, supported by artillery, support the infantry by beating down hostile machine gun nests.

Between the commanders of the artillery and tank units simple signals for the lifting or suspension of artillery fire, must be arranged. Moreover, the artillery liaison officers or advanced observers with the infantry companies keep the artillery commander informed of the advance made by the tanks, of tank obstacles and of delays in the tank advance.

When the attacking tanks are forced to stop and are unable to accompany the infantry farther, the infantry continues the attack, supported by artillery. Even when tanks are employed in great masses, communication between the infantry and artillery must be maintained continuously.

It is the mission of regimental and battalion artillery (close support artillery), of the infantry howitzers and of the heavy and light machine guns to support the tanks in every way possible.

For the breakthrough of the hostile main line of resistance "special mission guns" of the regimental and battalion close support artillery will be assigned the task of close support for the tanks. It shall be their mission to combat antitank guns in prescribed zones.

After the main line of resistance is broken through, the regimental and battalion close support artillery shall advance with the infantry and support the continuation of the infantry and tank attack.

The immediate support of tanks may be provided by elements of the artillery-armed tanks, which advance by bounds from covered position to covered position and neutralize hostile antitank guns.

Air observers must report promptly to the troops any new antitank means or measures discovered.

Accompanying tanks shall advance with the infantry and open the way for the infantry.

If two echelons of accompanying tanks are available, the first may be launched against the hostile heavy machine guns located deeply within the hostile position.

The commanders of tank units and of individual tanks must continuously observe for target designations from the infantry commanders and neutralize those hostile centers of fire which are impeding the progress of the infantry.

The tank platoon is the smallest unit of tactical employment.

The platoon may be attached to the infantry or may be assigned to support the infantry. In either instance the platoon commander must act in accordance with the desires of the infantry commander.

Since the cooperation of infantry tanks and artillery is of decisive importance in achieving success, the infantry battalion commander must make a personal reconnaissance and base his attack order on this reconnaissance and the cooperation which can be gained by the three arms. The order should be issued on the ground.

The time for the assault of the infantry is ordinarily that at which the tanks break into the main line of resistance.

After the assault echelons have broken into the hostile main line of resistance, ordinarily the heavy machine guns, the howitzers and other heavy weapons of the battalion can only fulfill their missions by working in close cooperation with the companies. Therefore, these weapons should be attached to the companies. The regimental commander exerts his influence by the timely employment of reserves, by assigning new missions to the artillery and tanks.

During the attack the advance of the infantry must not be stopped because tanks are unable to continue their advance.

Hostile counterattacks should be defeated by attacks of infantry supported by tanks. *In these situations tanks play a decisive role.*

The attack of the infantry and tanks shall drive through the entire depth of the defensive zone to destroy the hostile resistance and overcome his artillery.

The "distant objective" tank units and the "accompanying" tanks shall avoid assembling within the hostile zone of defense; they drive through to envelop (encircle) and completely destroy the enemy.

(d) *Pursuit.*—Upon the defeat of the enemy in his defensive zone, the immediate pursuit of the hostile forces

must be undertaken. The pursuit will be independently launched by infantry and tank elements as soon as the retreat of the enemy is recognized. The pursuit will be carried through with all available forces and with freedom of action to all commanders. Pursuing forces will not regulate their movements on less rapidly moving adjacent units. Even the smallest infantry or tank elements may, with bold leadership, deal the death blow to the enemy.

(e) *Attack launched from close contact. (Situation fully developed.)*—In such an attack tanks or mechanized units which are brought in as reinforcements are assembled in assembly positions so chosen that they are secure from artillery concentrations and air observation.

Reconnaissance of routes, of the assembly and attack positions, of zones of attack and the necessary preparations for the cooperation between the tank or mechanized units, the artillery and infantry are made by officers.

Engineers improve routes and assembly areas.

Tank elements will occupy their attack positions during the night immediately preceding the attack.

During the assembly the maximum camouflage measures will be taken. The primary mission of the air units will be the prevention of hostile air reconnaissance of the assembly positions.

(f) *Attack against fortified areas.*—For the attack against strongly fortified areas (permanent fortifications) heavy artillery, bombardment aviation, engineers and heavy tanks are needed.

(g) *Attacks to force a crossing of water courses.*—In attacks against river lines the commander of the force making the crossing in a given area (each division should be allotted two or more suitable crossing areas) is the commander of the crossing in that area. Engineers, artillery and other means will be attached to his command.

The plan of crossing provides for the employment of swimming tanks. In a daylight crossing the swimming tanks and infantry will cross simultaneously. Protected by artillery fire the infantry and swimming tanks make the crossing. It is their mission to beat down the forward hostile centers of fire.

Immediately following and on a broad front the next infantry echelon crosses to establish a bridgehead. Tanks should also accompany this echelon. As soon as the bridgehead is secured, bridge construction is begun.

Tanks in the Defense

The defense must stop the attack of superior forces. The defense must be so organized that:

(a) hostile tanks have little chance of breaking into the rear of the position;

(b) in the event hostile tanks break through the forward lines the antitank obstacles and guns will destroy them;

(c) hostile tanks which have reached the rear of the position will be destroyed by artillery fire and tank counterattacks;

(d) hostile infantry which has broken through will be stopped by infantry fire and destroyed by infantry and tank counterattack.

The divisional tank battalion must know exactly the most favorable routes and areas of employment, must have reconnoitered mine field and camouflaged trenches and these must be identified by suitable signs. It must also know where the friendly antitank guns and artillery are in position.

When there is sufficient time available camouflaged assembly and counterattack positions will be especially prepared for the tank battalion.

In the counterattack there shall be no limitation on the use of radio for communication between tank and other units.

At every favorable opportunity, and especially at night, surprise attacks will be made by tanks and infantry to capture prisoners and orders and valuable military papers.

Hostile infantry, which has broken through and threatens the rear areas, will be counterattacked by infantry and tanks, supported by artillery. Hostile tanks will be attacked by tanks. The objective of the counterattack is the restoration of the main line of resistance.

Tank units of motorized and cavalry divisions will be employed primarily against attacking hostile tanks or those which have broken into the defensive area.

Tank Employment Under Special Conditions

(a) At night.

Darkness makes difficult the employment of tanks. The infantry plays the principal role in night combat.

When wire entanglements have been placed in front of the hostile position tanks are suitably employed to open routes through the obstacle. In accomplishing this task they immediately precede the infantry. The area and direction of tank operation will be reconnoitered during daylight. Consideration must be given to the fact that the employment of tanks on this mission will more or less decrease surprise, and that the activity of tanks at night should be limited to the opening of these routes through wire entanglements.

(b) Tank employment in winter.

Off roads the operations of tanks are made more difficult in winter.

Reconnaissance on the march is accomplished by patrols on snowshoes, by cavalry, by tanks and cross-country vehicles.

In deep snow the attack will ordinarily proceed along roads. Strong shock units of infantry on snowshoes, tanks and artillery seek to strike the enemy in flank and rear. Tanks can be used in attack in snow up to 30 centimeters deep.

In the pursuit, detachments on snowshoes are especially valuable. Speed and saving of energy will be secured by having the infantry on snowshoes ride on the tanks.

(c) Mountain warfare.

Combat in mountains will ordinarily be conducted by small mixed units. Except in especially rough areas where no roads exist, tanks, in units as large as battalions, can ordinarily be employed successfully. Their speed is less, the consumption of oil and gas is greater. Often routes of advance for the tanks must be improved.

In mountains tanks move in special march groups. If a march of more than 6 or 7 hours is made a long rest should be interposed. Hourly halts of about ten minutes are normal. In climbing steep inclines a 2 or 3 minute rest is made every 15 or 20 minutes, in addition to the hourly halts.

Shock units, reinforced by tanks, are employed to envelop or turn the enemy.

(d) Woods fighting.

To capture a large wooded area requires the coordinated attack and defeat of the enemy on the near edge. The attack must be strongly supported by artillery and often will be supported by tanks. The combat in the woods will be carried on by independently acting reinforced battalions and companies. Upon emerging from the far side of the woods the normal combat formations will be resumed, including the close cooperation of the infantry, artillery and tanks.

(e) Combat on the plains.

Moto-mechanized and tank units can be employed with great success on open flat terrain. In such combat it is the mission of engineers to provide for water and the maintenance of motor (supply) routes.

A march will be protected by motorized infantry and cavalry.

In an attack, infantry will fix the enemy in front while the decisive blow is made against the hostile flank. Infantry, supported by the mass of tanks and by air forces constitute the main (decisive) attack force.

(To be continued)



Ordnance

Book Reviews

BY LIEUTENANT J. W. RUDOLPH, *Infantry*

DER DURCHBRUCH. STUDIE AN HAND DER VORGANGE DES WELTKRIEGES 1914-1918.

[The breakthrough. Studies based on operations in the World War, 1914-1918]

BY GENERAL KONRAD KRAFFT VON DELLMENSINGEN
450 pages . . . Hamburg: Hanseatische Verlagsanstalt

The military student is better qualified, by virtue of study and experience, to discuss the principle of the breakthrough than General von Dellmensingen. Chief of Staff for the German Crown Prince and later of the Seventeenth Army, he proposed a breakthrough near Arras in 1915, planned the Caporetto operation, and directed the assault upon the British Third Army in March, 1918. Result of his reflection is a valuable analysis of the breakthrough in all its World War aspects, with special emphasis upon the 1918 spring drive.

Employing and discussing numerous World War examples, the author classifies breakthroughs under three general heads. Marne and the First Ypres were illustrations of the breakthrough in open warfare. More numerous were the attempts to penetrate prepared and continuously defended positions, the most difficult operation of all; while the war also offered interesting examples of breakthrough operations in which special weapons such as gas, tanks, and mines were relied upon for success. Other special cases included river crossings, through mountains, and against permanent fortifications.

Many factors affect the success of a breakthrough. Basically, the attack must enjoy overwhelming superiority of numbers (to include free reserves double those of the defenders) and must be directed at a decisive point. Time is everything. In the words of Moltke I, it cannot be decisive unless "effected by one blow within a very short space of time."

Regarding the attempt of March, 1918, against the British sector, General Dellmensingen criticizes the plan because it did not tally with the main strategic idea, since it did not threaten vital interests of the defense. He also warns against carrying diversion attacks too far, as was the case with the Chemin des Dames drive of May, 1918, whose success diverted Ludendorff from his true strategic goal.

THROUGH THE FOG OF WAR

BY B. H. LIDDELL HART

379 pages . . . New York: Random House

"This is the legitimate aim of military criticism, not to build up or pull down the reputations of military commanders but to assist military students to perfect themselves in the art and science of war."—*General John M. Schofield.*

Captain Liddell Hart might well consider the above quotation. It is good advice which, if he ever heeded, he has

apparently forgotten. Certainly, his prolific and talented pen has produced no more severe stricture upon the abilities of World War commanders than his latest volume.

A decade ago Captain Liddell Hart published "Reputations Ten Years After," a praiseworthy attempt to evaluate military leadership in the after glow of ten years of peace. "Through the Fog of War" is a revision of his estimate of ten years ago. Against a none too clear background of the war, the author subjects the professional ability, characters, and souls of its outstanding commanders to a merciless barrage. Years of reiteration have polished his weapons to a flashing brilliance, without, however, adding anything to what he has already said.

Much criticism is undoubtedly deserved. The military profession would merit little more than Liddell Hart is willing to concede if it were incapable of admitting and profiting by past mistakes. On the other hand, the author owes to military history and to his targets the admission of his more comfortable perspective. Neither is he justified in passing final judgment on the facts of history by the simple process of accepting what he wants to believe while contemptuously rejecting what does not bolster his own thesis.

Liddell Hart has built a world-wide reputation as an authoritative and brilliant military writer. That he is an excellent writer this book again demonstrates. His authority in military matters, however, is becoming more and more open to question, for his methods are not those of a student sincerely striving for the truth. A reputation entails certain responsibilities. Unfortunately, the present book flouts those obligations. It is excellent reading but unreliable military history.

LEE, GRANT AND SHERMAN

BY LT. COL. ALFRED H. BURNE, D.S.O.

175 pages . . . Aldershot: Gale & Polden

Recently published biographies of three outstanding generals of the Civil War, each extolling the virtues of its particular hero, prompted Colonel Burne to examine the careers of all three in a single, comparative volume. The result is a short, compact study of the 1864-65 campaigns, punctuated with critical comment, and climaxed by the author's ranking of the three chief commanders. The title might well have included John B. Hood, who receives more credit herein than his reputation has previously enjoyed.

The tactical analysis of operations in both theaters of the war are models of clarity and accuracy. Colonel Burne has bulwarked an exhaustive study of the records with personal visits to the Virginia battlefields. Familiarity with the eastern front may account for his tendency to underestimate the importance of events in the west.

Lee, Grant and Sherman are ranked in that order of excellence, a conclusion generally conceded. Although the au-

thor is at some pains to insist that all three were great men, many of his critical arguments are contradictory and open to question. Lee, for example, is rather too gently treated, while criticism of Sherman is often too severe. Colonel Burne is second guessing over a comfortable gap of seventy-five years; quite different from the necessity of prompt decisions in the field. He likewise betrays inadequate knowledge of the American political and economic situation, factors which exerted tremendous influence upon the conduct of the war.

In spite of its faults, the book is scholarly and well done, with a narrative that is simple and clear. A valuable and interesting contribution to Civil War literature, it is well worth reading.

**OFFICIAL HISTORY OF THE GREAT WAR.
MILITARY OPERATIONS IN FRANCE AND BELGIUM,
1916.**

Vol. II: 2nd July to the end of the battles of the Somme

COMPILED BY CAPTAIN WILFRID MILES

601 pages . . . London: Macmillan & Co.

The second volume of the official account of the 1916 battle of the Somme is devoted to the five months of almost incessant attacks beginning with the offensive of July 1st. It follows by seven years the first volume, which described the preparations for the Somme blood bath and the first day of the offensive. While the account is generally adequate, it is occasionally blurred by lack of full description. So many operations took place during those five months that space could not be found for more than brief mention of many things.

Captain Miles' analysis is a quietly worded but constant criticism of lost opportunities and of the failure of British offensive methods to keep pace with German defense tactics. In this connection, the most illuminating passage is a German impression of the difference between French and British attacks.

Where the former bombarded in depth and attacked in small groups, the British shelled only front lines and were then cut down in mass onslaughts against intrenchments. The British, far from relying on artillery support, expected too much of the infantry. Moreover, the high command tried to maintain rigid control, refused to allow divisional commanders sufficient initiative, and ignored the reports of commanders at the front. Siege methods were neglected.

Unfortunately, this book, while giving evidence of wide and scholarly research, is weakened by its attempt to justify Haig's continuance of the Somme offensive in the face of mounting casualty lists and meager gains. While it may be true that the battle was also a severe drain on the German Army, it does not necessarily follow that equal or more valuable results could not have been obtained by better and less costly methods. The assertion that German casualties were actually greater than those of the British and French combined is at variance with official German figures and subject to question. It is not generally accepted that when opponents are "equally matched," the defenders suffer more than the attackers. In football or the ring, perhaps, but not upon the modern battlefield.

THE RIFLE IN AMERICA

BY PHILIP B. SHARPE

619 pages . . . New York: William Morrow & Co.

That the compilation of this remarkable volume was a labor of love is as obvious as the fact that love's labor was far from lost. Mr. Sharpe has produced a history of rifle development for which every shooting enthusiast will be everlastingly grateful. Nothing quite like it has ever been written before; more than an interesting narrative of a colorful evolution, it is a source book for all conceivable information about rifles, ammunition, and accessories.

In 620 exhaustive and attractive pages, Mr. Sharpe portrays the evolution of the rifled firearm from the muzzle loading musket and long rifle of the Revolution to the sleek Garand whose development by the United States Army has rendered obsolete every other military rifle in the world. He discusses graphically the invention and refinement of the percussion cap, without which modern firearms would have been impossible; the development of the modern "boat tail" cartridge from muzzle loaded powder and ball; and finally a description of virtually every rifle that has been manufactured in this country since the Revolution.

Military readers will find particular interest in the chapters devoted to military firearms. It is a field in which the United States Army has played the leading role, for American army experts have been instrumental in nearly every phase of the development of the modern, high velocity rifle. The army produced the Krag-Jorgenson, then the Springfield—after a generation still the best of its kind in the world—and finally the revolutionary Garand. Highly interesting is the chapter devoted to World War rifles of all nations.

Not content with sound advice on cartridges, sights, and other gadgets dear to the hearts of game hunters and target experts, the author expresses some opinions on the rifle of the future that are rather astonishing. Although it has been criticized for minor deficiencies discernable only to the most learned, the book gives evidence of long and exhaustive research. Mr. Sharpe is to be congratulated upon an extremely valuable work.

A PURITAN IN BABYLON

BY WILLIAM ALLEN WHITE

444 pages . . . New York: Macmillan & Co.

Although this intensely human interpretation of Calvin Coolidge will not rank among his definitive biographies, it will constitute an imperative reference for any future life history of "Silent Cal." William Allen White has again demonstrated why he holds such a firm grip on the affections of the nation, for he has written a charming book that is an ideal combination of kindness, insight, humor, and fine writing.

The title expresses its contents as aptly as any summary. As White saw Coolidge, the quiet little man was a New Englander all his days, with few deep interests outside his home section, endowed by birth and training with traditional New England conscience and prejudice—including deep re-

spect for material wealth as a gauge of moral as well as worldly success. Although his political training and truly fine intellect fitted him for the job, he was never comfortable in the White House.

Coolidge's curious inability to express his true feelings caused him to draw a shell about his personality—a shell, however difficult to penetrate, worth attacking for the sake of the man behind it. Despite his austere facade, Coolidge was a kindly, sentimental man, whose inner self occasionally broke its shackles with little, thoughtful gestures as delicate as they were unexpected.

Mr. White admired and liked Calvin Coolidge, both as a man and as a president, a fact self-evident without the author's frank admission. Admiration, naturally, weakens the analysis of Coolidge's character and ability but heightens the dramatic effect of the author's excellent writing. His attempt to strike a critical balance is otherwise generally successful.

IMPERIAL JAPAN, 1926—1938

By A. MORGAN YOUNG

328 pages . . . New York: William Morrow & Co.

Twenty-four years of experience in Japan, the last ten of which were spent at the editorial desk of the *Japan Chronicle*, have given Mr. Young a thorough understanding of the Japanese scene and a unique opportunity to witness and evaluate trends and events in Japan. Therefore, this book, a sequel to an earlier and similar volume, may be accepted as a valuable addition to a growing literature on modern Japan. As such it constitutes a powerful indictment of recent Nipponese actions, not only in its factual content but in its studied restraint.

Resuming where his previous book ended, Mr. Young carries his account of contemporary Japanese history from the beginning of the Showa period through earlier events of the present war with China. He covers the brief period of liberal government, the rise of the Chinese Kuomintang and its repercussions in Japan, the Manchurian conquest, and the Shanghai affair of 1932. For all its accusing properties, the book is merely a chronicle of events, wherein the author allows the facts to speak for themselves.

Primarily, the author proceeds on the assumption that there exists in Japanese politics a fundamental cleavage between the civil government and the military, with the latter now firmly in the saddle. Based upon that thesis, some of his statements are startling. The defense services, he accuses of being so utterly corrupt, that even murder is applauded if committed for the right purpose. The apparent lack of reason or morality in Japan's international behavior he attributes to the vast difference between Japanese ethical concepts and western standards.

Although a story of events, the book is arranged according to subject rather than a strict chronology, resulting in unusual clarity. Slightly tinged with irony, it will be equally welcome to the casual reader on the Far East and the understanding student of oriental history.

THE FAR EASTERN POLICY OF THE UNITED STATES

By A. WHITNEY GRISWOLD

530 pages . . . New York: Harcourt, Brace & Co.

In 1898, George Dewey, sailed into Manila Bay, smashed its defending fleet, and presented the United States with a Far Eastern empire. He also created a diplomatic problem which his countrymen have consistently bungled ever since. Such is the considered opinion of this book, a realistic interpretation of our Pacific diplomacy for the past forty years, which is not only authoritative but differs sharply from traditionally accepted estimates of American statesmanship.

Briefly, the author states that our Far Eastern policy has been bungling, overambitious, and based upon illusions which have aided everyone but ourselves. Our well meaning diplomats have miscalculated subtle and selfish factors, have been led into one maze after another, to emerge with paper victories or open defeats. As Allan Nevins puts it, "the cycle was one of confident advance, confused action, and ultimate retrenchment or capitulation."

First fruit of our excursion into far waters was the Open Door doctrine of John Hay. According to Mr. Griswold, Hay was led like a child in the wilderness into a policy which, while assisting American interests but slightly, rendered excellent service to Great Britain. Roosevelt's peace making at the end of the Russo-Japanese War aided beaten Russia, exhausted Japan, and crafty Britain without netting the United States more than the ill-will of China and Japan. Wilson's thwarted attempt to curb Japanese expansion resulted in the "status quo" treaties of Washington which settled nothing.

Based upon the archives of the State Department, private papers of Presidents and Secretaries of State, as well as the best printed sources, this book is one of the most thorough studies of our Far Eastern policy ever written. It should be valuable for a realistic study and consideration of our future actions in the Pacific.

THE FORGOTTEN PEACE: BREST-LITOVSK, MARCH, 1918.

By JOHN W. WHEELER-BENNETT

453 pages . . . New York: William Morrow & Co.

On March 3, 1918, representatives of the German General Staff and the recently successful revolutionary government of Russia, meeting in the obscure Polish town of Brest-Litovsk, concluded the treaty that removed Russia from the ranks of the Allies. Eight months later that treaty, swept away in the collapse of Imperial Germany, receded into the background of the World War where it remained until the appearance of this book, which resurrects Brest-Litovsk in its true importance to the history of the conflict.

The "peace of Munich" is generally conceded to have been the inevitable incident in the aftermath of the Treaty of Versailles. In the thesis of Wheeler-Bennett, Versailles was the outcome of Brest-Litovsk, for the Allies, shocked by the terms of the dictated peace, determined to crush the military power of Germany. It was the mistake of Versailles that, refusing a peace that would have been enduring, the

treaty-makers failed to destroy that power. Under Hitler and the bitterness engendered at Versailles, German might has flowered more potently than ever.

This book describes Brest-Litovsk from the outbreak of the Russian Revolution, which brought Lenin rushing across Germany from exile, to the unsuccessful attempts of the German high command to impose upon the Ukraine the provisions of the treaty. In fact, Brest-Litovsk was for Lenin a peace of necessity in spite of its severity, for without peace his revolution would have failed. Although this "Tilsit peace," as Lenin called it, cost Russia 34 per cent of her population, 89 per cent of her coal mines, 54 per cent of her industrial establishment, and 32 per cent of her agricultural land, the revolution won in the end.

The story of the framing of that peace and its aftermath makes thrilling reading. Not only has Wheeler-Bennett produced a book in the best tradition of moving, readable style but he has based it upon extensive and admirably documented research. The author personally interviewed many of the outstanding personalities of the Brest-Litovsk conference and has skillfully interwoven their stories of the meeting with penetrating word pictures of the actors themselves.

NAVAL DOCUMENTS RELATED TO THE QUASI-WAR BETWEEN FRANCE AND THE UNITED STATES, FEBRUARY 1797—DECEMBER 1801.

VOLUMES I TO VII.

EDITED BY CAPTAIN DUDLEY W. KNOX, USN, RET.

. . . Washington: Government Printing Office

The appearance of the seven volumes of early history, dealing with our near-war with France shortly after the rise of Napoleon, is the first step toward a type of project which has long been carried out in England. Those who love the sea and the stories it holds will echo the hope of Hanson Baldwin that the work will continue until all important old naval documents have been thus published. Captain Knox has enjoyed a wealth of material, to which he has devoted his recognized talent with conspicuous success.

Captain Knox, backed by the personal interest of the President himself, has done a splendid job of research and editing. Never before published source material of the years when the foundations and traditions of the American Navy were being built has been made available to the student, the historian, and the plain individual who enjoys a good sea story. All of the documents, arranged chronologically, have been selected from the Navy archives, public and private papers, and records of other departments. The men, the ships, and the sea are presented in the quaint phraseology of a century ago.

The documents cover the period of our near clash with France when both Napoleon and England were waging war on each other by crushing American trade. They include the report of the capture of the French frigate *L'Insurgente*, the establishment of the Marine Corps, and letters and reports of our earliest naval commanders and statesmen. Complete lists of warships, lists of supplies, rolls of the navy, and promotions of all officers are here recorded. As Mr. Baldwin, military and naval correspondent of the New

York Times, has pointed out, there exists no other similar and accurate picture of this period of our naval history. These books, 4600 pages in all, constitute a valuable compilation of important source material.

TWENTY YEARS' ARMISTICE: 1918-1938

BY WILLIAM ORTON

298 pages . . . New York: Farrar & Rinehart

Although among the first of the flood of interpretations of the post war period that ended with the Czechoslovakian crisis and the triumph of the Third Reich is one of the best that has yet appeared. Mr. Orton's economic background (He is professor of economics at Smith College) and his knowledge of European politics have given him a valuable double viewpoint from which he has made some interesting observations.

To Professor Orton, the tragedy of twenty years between Versailles and Munich was the refusal of the World War victors to rectify the injustices of the peace treaty before the vanquished took matters into their own hands as a last resort. France and England, intent upon keeping Germany subdued, used the League of Nations as an agent for enforcing the Treaty of Versailles instead of a mutually cooperative assembly. The device, supplemented by the French system of political and military alliances with artificially created states, succeeded until Germany was in a position to offer more economic inducements to those states than France could meet with money grants.

As soon as Germany realized that she could hope for no treaty concessions from Britain and France, the destruction of Austria and Czechoslovakia became a matter of time. German successes in the Rhineland, Austria, and Czechoslovakia have been won on moral grounds so untenable that the war victors could not rally opinion to wage war against the changes. Particularly is this true in the case of Austria, where first the stubbornness of France and later the shortsightedness of Schuschnigg destroyed Austrian independence.

Aside from minor inaccuracies, which are happily few and of negligible importance, this work is an excellent piece of research, analysis, and writing. Professor Orton has painted a brief but adequate background for the future study of the post-war pre-Munich era—a critical and none too savory period of international relations.

WHEN THERE IS NO PEACE

BY HAMILTON FISH ARMSTRONG

236 pages . . . New York: The Macmillan Co.

What William Orton has done for pre-Munich history, Hamilton Fish Armstrong has accomplished for the immediate crisis itself. Better known writers than he have reviewed the weeks of last autumn that carried Europe to the brink of war, but none have achieved his restraint or balance. In addition, Mr. Armstrong has compiled a clear and powerful review of events in the year 1938.

That year opened with a Fascist victory when Anthony Eden resigned the British foreign office portfolio. Then followed the swift, bloodless invasion of Austria, to the tune of German denials of ambitions in Czechoslovakia. British-Italian negotiations failed, and Nazi propaganda thundered against the democracies. Came September and the high tide of totalitarian power politics.

The author has devoted chief space to the events from Hitler's Nuremberg speech of September 12th to the last minute capitulation at Munich which snatched a thoroughly frightened Europe from the threshold of conflict and made Germany master of Eastern Europe. Careful marshalling of existing documentary and newspaper evidence has been buttressed by personal knowledge of European political affairs. The account, although far from complete, includes practically everything available at this early date.

Except for the inclusion of the full text of the Czech reply to the allied plan of September 19th, the book contains no new material. Its true value lies in its interpretation. Briefly, the author concludes that while Munich averted a ghastly war it did not insure a peace. The democracies purchased an armistice for which the future will demand payment.

UNCONQUERED

By JAMES BERTRAM

340 pages . . . New York: John Day

Of all writers now occupied with the story of China's amazing and still beclouded resistance north of the Yellow River, perhaps only Edgar Snow ranks with James Bertram in the matter of intimate familiarity with the North China

scene. Bertram, first man to get the inside story of the Sian mutiny of 1936, has enjoyed the inestimable advantage of knowing both sides of the conflict, although it must be borne in mind that his sympathies always have been with the Chinese Communists.

Bertram was in Japan in June, 1937, in a position to get Nipponese reactions to Lukouchiao. He was present at the capture of Peiping, then visited Tsingtao and Tsinan before entering the northwest, where he spent several months with the Communists forces of Sian, Yen-an, and the mountains of Shansi. A year after the war began, he was back in Tokyo. His book is a remarkably vivid and informative account of what he heard, saw, and did.

Previous stories of guerrilla activity in North China, notably Agnes Smedley's *China Fights Back*, while painting a colorful (and colored) background of guerrilla resistance, have been weak in their description of military operations. *Unconquered* notably remedies this deficiency with a good general picture of the fighting in North Shansi as well as the first detailed description to appear in English of the tactics and "short attack" of the former Red army. Portraits of communist leaders and excerpts from captured Japanese diaries are extremely vivid.

Bertram's conclusions agree essentially with those of all writers sympathetic to China and must therefore be accepted with caution. At the same time, so many have told the identical story that considerable credence must be accorded this book, which is, after all, an eye witness account. Because China has required unexpected unity; because, properly led, the Chinese are courageous and able fighting men; and because the Japanese war machine lacks flexibility to overcome the guerrillas, Bertram feels that China will win. However, he does not ignore the IF's of the case nor the tremendous task facing the Chinese leaders.



U.S.A. Signal Corps

Reading Course for Officers

WAR DEPARTMENT BULLETIN, 1928

List of selected books relating to historical, political, economic, and military subjects, published for the information of the service.

This list is divided into sections corresponding to the several periods of an officer's service. Remaining sections will appear in future editions of the Quarterly. (For First Period, see the June 1938 Quarterly, page 142; for Second Period, see the September 1938 issue, page 55; for Third Period, see the December 1938 issue, page 47.)

FOURTH PERIOD (AVERAGE FOUR YEARS)

(INTERVAL BETWEEN COMMAND AND GENERAL STAFF SCHOOL AND THE ARMY WAR COLLEGE)

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| THE WAR OF THE FUTURE IN THE LIGHT OF LESSONS OF THE WORLD WAR. 1 vol. (Friedrich A. J. von Bernhardi) | THE CROWD—A STUDY OF THE POPULAR MIND. 1 vol. (Gustave Le Bon) |
| ON WAR. 3 vols. (Carl von Clausewitz) | SEA POWER AND ITS RELATION TO THE WAR OF 1812. 2 vols. (Alfred T. Mahan) |
| THE NAVAL HISTORY OF THE WORLD WAR. 3 vols. (Thomas G. Frothingham) | THE INFLUENCE OF SEA POWER UPON THE FRENCH REVOLUTION AND EMPIRE, 1793-1812. 2 vols. (Alfred T. Mahan) |
| THE CONDUCT OF WAR. 1 vol. (Colmar F. von der Goltz) | HISTORY OF THE WAR IN THE PENINSULA AND IN THE SOUTH OF FRANCE FROM THE YEAR 1807 TO THE YEAR 1814. 6 vols. (Sir William F. P. Napier) |
| THE NATION IN ARMS. 1 vol. (Colmar F. von der Goltz) | THE RISE OF RAIL POWER IN WAR AND CONQUEST. 1 vol. (Edwin A. Pratt) |
| WELLINGTON. 1 vol. (Philip Guedalla) | SOLDIERS AND STATESMEN, 1914-1918. 2 vols. (Sir William R. Robertson) |
| OUT OF MY LIFE. 1 vol. (Paul von Hindenberg) | POLITICAL AND SOCIAL HISTORY OF THE UNITED STATES 1829-1925. 1 vol. (Arthur Meier Schlesinger) |
| POLITICAL AND SOCIAL HISTORY OF THE UNITED STATES 1492-1828. 1 vol. (Homer C. Hockett) | MY MEMOIRS. 2 vols. (Alfred P. F. von Tirpitz) |
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Division Artillery in Development and Attack

BY MAJOR R. T. GUTHRIE, *Field Artillery*

1. GENERAL.—Herein shall be discussed the employment of the division field artillery in development and attack. It is assumed you are already acquainted with the organization of this artillery and with the characteristics of its weapons. First, let us consider the general nature of artillery supporting fires.

2. SUPPORTING FIRES.—a. The 75-mm gun is a close-support weapon. This means that the bulk of its fire will be put down close in front of the supported infantry, on targets most immediately threatening the infantry, and the fire must be closely coordinated with that of the infantry weapons. It does not fire on targets within 200 yards of the

infantry because of dispersion and the range of shell fragments.

GENERAL NATURE OF SUPPORTING FIRES

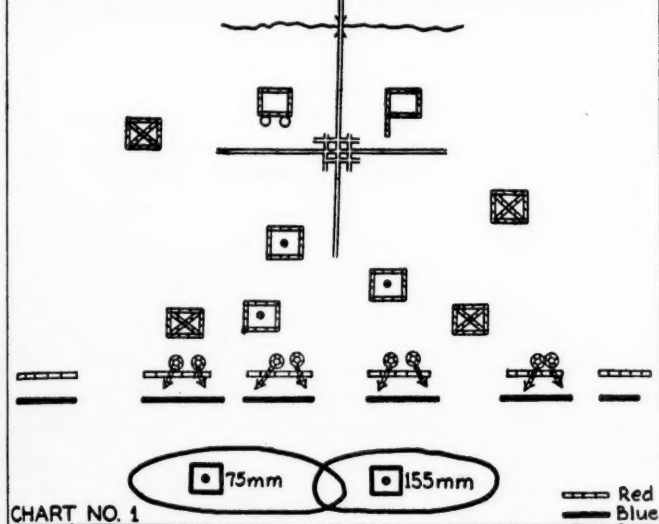


Chart No. 1 shows the artillery and infantry in position. The normal targets for the 75-mm guns would be the hostile infantry position and assembly areas, the automatic weapons, and local reserves.

The power and range of the 155-mm howitzer permit its use on targets deep within the enemy position. Its primary mission is counterbattery, but when the division is part of a corps, the corps artillery is responsible for this mission. It is also called on to interdict important parts of the enemy road net to prevent or hinder movement of enemy troops and supplies, and to smoke hostile observation. Another important mission of the howitzer is to reinforce the fires of the light artillery. By this is meant the deepening and giving of additional power to the close-support missions of the light gun.

Howitzers would also fire when necessary on enemy infantry elements nearer the front lines, where more explosive power is needed than the 75's can give. The 75's in attack are well forward, and with their flat trajectory many areas may be dead space to their fire. The howitzers must handle the targets in such areas. However, they do not fire within 500 yards of friendly troops. There is no line dividing the areas of responsibility for these two types of guns—the 75's may have to fire counterbattery or on other targets to the limit of their range.

In the attack there are two general methods of furnishing close support: rolling barrages and offensive concentrations. The rolling barrage is a moving curtain of fire which the infantry follows. This is a very effective method of support but requires a large amount of artillery and ammunition; one light battery per 100 yards of front and additional fire by light or heavier weapons to give the barrage depth. The division artillery could only cover about 1,000 yards of frontage with a good rolling barrage. In open warfare the use of the rolling barrage will usually be precluded because of the limited amount of artillery and ammunition available. The method of offensive concentrations is more economical and flexible. It provides for placing artillery concentrations

on critical parts of the front, neglecting other parts where fire is not needed or where support can be accomplished by infantry weapons. These concentrations are placed on successive objectives and lifted to new objectives as the infantry advances.

What is meant by the term "concentration"? A concentration is a volume of fire placed upon a limited area within a limited time. Consider for example the concentration fired by a light battery. These are assigned to the battery and assigned as circles 100, 200, or 300 yards in diameter. This is for convenience in plotting. The size of the concentration depends on the size of the target, the accuracy with which it is located, or the relative accuracy of the method of fire. With observed fire the battery fires a volley for every 100 yards in width, at the ranges of the limits of the area and at each 50-yard range between, dispersion in range taking care of distribution throughout the area. When data is computed by a transfer of fire, ranges 50 yards short and over are included; when using map data corrected, ranges 100 yards short and over are included. The number of times the concentration area is fired through depends on the importance of the target and the ammunition available. The amount of ammunition to be fired in these concentrations is also standardized. For example, for initial neutralization of a 200-yard standard area, firing twice through the area at each 50-yard range, 80, 112 or 144 rounds would be fired, depending on the accuracy of the method of securing the firing data. Fire is opened suddenly and carried out rapidly. It takes about 5 minutes to fire this. A concentration is more effective if several batteries fire the same concentration at once: they are often fired by the 3 batteries of a battalion. This gives greater surprise and moral effect, and better probability of surely covering the target area with effective fire. If the area is large, the battalion area is divided into appropriate battery areas. The concentrations are usually planned in advance by the infantry and artillery combat-team commanders. They are usually sent to the batteries on overlays, and the battery prepares to fire them, by number, either on a time schedule or on call. In addition to the prepared concentrations, fire is placed on new targets as they appear. When infantry calls for fire on a target which can be seen by an artillery observer, either by a forward observer, or one at an observation post, in a balloon or airplane, fire is adjusted on the actual target and then concentrated on it. Similarly when an artillery observer sees a target which should be fired on, he reports it or adjusts the fire of his battery on it.

What is an artillery preparation? It is artillery fire delivered prior to an attack to facilitate the subsequent advance of the infantry. It is usually participated in by all the artillery present on that part of the front.

An artillery preparation may be fired, providing ammunition is available, surprise is not sacrificed, and we have sufficient information of definite targets. In open warfare a preparation, if fired, will usually be short and be placed on the forward elements of the hostile infantry position.

b. Positions.—Position areas for artillery in the offensive should be well forward, in order to be able to reach deep within the enemy position, obviate early displacement forward, and facilitate communications with supported units. In the usual terrain they will be from 1,500 to 3,000 yards

from the line of departure. If the 75-mm guns were placed closer than 1,500 yards from the hostile front line and still be able to fire on it, they would, because of their flat trajectory, have very little defilade in the usual terrain and would generally be exposed to observation and small-arms fire, and considerable areas in the hostile forward zone might be in dead space to them. The howitzers are less mobile, but because of their curved trajectory they can be in positions as far forward as the guns, or even farther. The 75's have priority in the selection of positions because suitable positions for them are harder to find.

Actual selection of gun positions for each battery must be done on the ground. The primary consideration is that the artillery must be so located as to execute the required fire missions. Positions near good observation and near good roads with concealment from ground and air observation are very desirable. They are normally in the sector of the unit they support, to favor close liaison and control and to fire in the direction of the zone of advance. To favor prompt establishment of communications and ease of control, the batteries of a battalion should not be widely dispersed.

c. *Observation.*—Good observation so improves the accuracy of artillery fire that it is a vital consideration. As far as ground observation is concerned, in addition to OPs for each unit, we depend largely on observers well forward, close to the attacking infantry. Air observation is of great importance, especially in firing counterbattery and interdiction. For this reason the balloon is normally installed close to the positions of the howitzer regiment, and airplanes are designated for artillery missions.

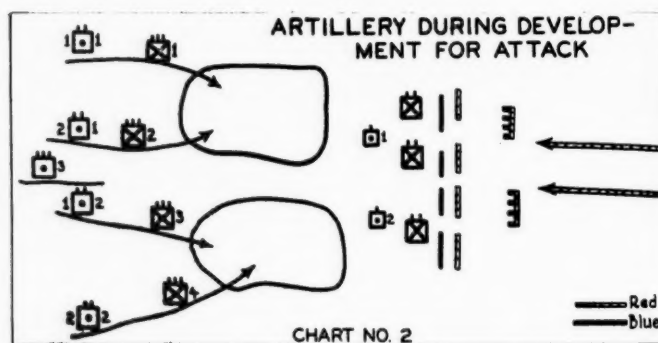
d. *Liaison.*—Command liaison is obtained through the association of the corresponding infantry and artillery commanders (or their representatives) throughout the division. In addition, each light battalion sends a liaison detachment to each assault battalion of the infantry regiment it is supporting. The division medium artillery usually establishes liaison with those light-artillery units which are in direct support and which have normal zones within that of the medium artillery concerned. It rarely establishes liaison directly with infantry units.

e. *Control.*—In its employment in fire-support missions, artillery may either be placed in general support, in direct support, or be attached. General support artillery supports the unit as a whole. It receives its fire missions from the division commander through the artillery brigade commander. It is prepared to support any part of the division front, with its positions such that it can concentrate the bulk of its fires in the area of the division main effort. The bulk of the howitzers are generally kept in general support.

The light artillery is normally placed in direct support of subordinate infantry units of the division; a light regiment in direct support of an infantry brigade. Direct support artillery establishes liaison with the infantry unit which it is assigned to support, plans its fires with the infantry commander, and executes the fires requested by that infantry. However, it remains under the command of the artillery brigade commander, and its fires and positions are supervised and coordinated by the division and artillery brigade commanders, and it is available for fire missions desired by the division commander in emergencies, which

take priority over its direct support missions. Therefore both artillery in general support and that in direct support are available to the high commander, permitting him to concentrate their fire on critical parts of the front within their range at such times during the attack as will best assist the success of the division attack as a whole.

Situations arise, however, when the division and brigade commanders are not able to directly supervise and coordinate the fires of some of the artillery. In such case, that artillery is attached to the infantry unit which requires its support. Examples of this are: artillery with an advance guard, with an encircling force in a pursuit, or on a distant part of the front in a wide envelopment. Artillery is attached only when, because of distances or the rapidity of the action, difficulties of communication, observation and information would make its operation under division control definitely less effective than it will be under the command of the local supported infantry commander.



3. *DEVELOPMENT PHASE.*—Now we will consider the case where the division has just begun to develop for an attack. (See Chart No. 2.) Here we have a division marching in 5 columns. The 4 leading columns, each a combat team of an infantry regiment and a light artillery battalion less covering forces, are entering their assembly areas. The advance guards are in contact with hostile covering forces and at this time some light batteries are probably supporting the advance guards. The remainder of the artillery is still in column. During this phase a certain number of infantry battalions will be committed to drive in the enemy covering forces—often under control of one of the brigade commanders. The question now arises as to how much of the artillery should be placed in action to support this preliminary action. First let us see what might be accomplished by the artillery at this time.

The light guns can furnish close support to the infantry, firing on targets holding up the advance. The howitzers can neutralize any enemy batteries in action that can be located and thus prevent heavy infantry losses. They can interdict enemy columns and so interfere with the enemy deployment. In addition they can reinforce the fires of the light guns in close-support missions where more power is needed.

Only a relatively small amount of infantry is to be used in this type of action and therefore strong artillery support is required to obtain the necessary fire power.

It will often be found necessary to commit at least one light regiment and one howitzer battalion during the advance guard action, and we should not hesitate to use all of the artillery, if it is needed. It can move up rapidly at in-

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creased rates if necessary, passing the infantry on the roads or moving cross-country if terrain permits.

The light artillery so employed might be attached to advance guards acting independently, or be in direct support of the advance guard action is coordinated by a higher commander, and the medium in general support.

The remainder of the artillery will continue to move with the columns and later to position areas for the attack. Or it may be moved forward to positions in readiness where it will be more readily available to support the infantry fighting in the covering forces if needed.

The light batteries which were attached to the advance guards revert to battalion control when the remainder of their battalions are placed in position. This is necessary to obtain coordination of artillery effort. Similarly, batteries which may be with reconnaissance detachments revert as soon as the mission of the detachment permits.

Some of the gun positions occupied at this time will probably not be suitable for the attack since they will be too far back after the covering forces are driven in. This will usually require displacement forward to new positions prior to the attack.

Air observation should be placed at the disposal of the artillery at this time—the balloon moving forward to an ascension point when any part of the medium artillery is committed.

During this phase the artillery will usually depend on its liaison detachments for information of the location of friendly lines which is essential for effective close support, and for conducting fire on targets not visible from hastily selected observation posts.

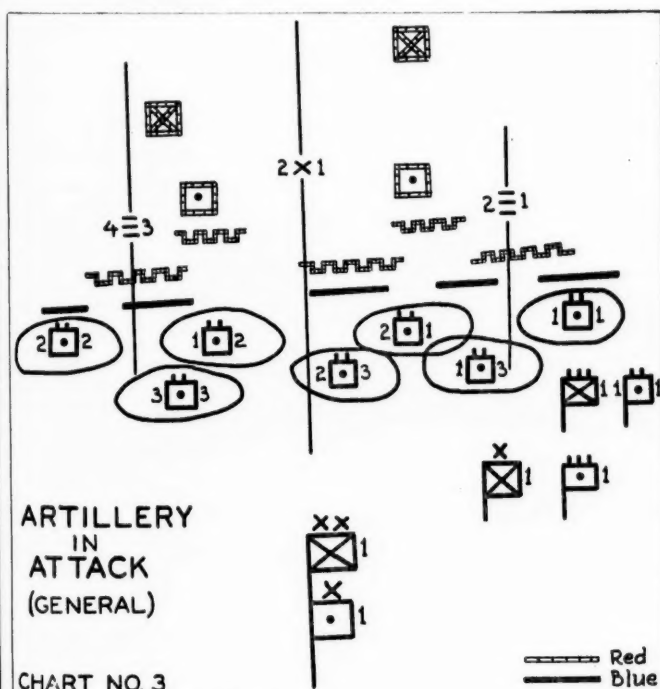
in direct support of each brigade and the howitzer regiment in general support of the division. This is desirable in order that the division commander may be able to mass the fire of the artillery on critical parts of the front as the attack progresses.

Then we will have one light regiment in direct support of each infantry brigade, preferably though not necessarily forming the combat teams which have been in existence since the division was formed: in this case, the 1st Field Artillery supporting the 1st Brigade and the 2d Field Artillery supporting the 2d Brigade. The commanders of the light regiments will place their battalions in direct support of infantry regiments, the 1st Battalion 1st Field Artillery supporting the 1st Infantry, etc. These are assumed to be the normal combat teams in the 1st Division. Teamwork is obtained by conferences between commanders; between infantry brigade commanders and the light artillery regimental commanders; infantry regimental commanders and light artillery battalion commanders; and assault battalion commanders and artillery battalion liaison officers. This may be considered as a normal set-up for the use of the artillery in an attack where the infantry brigades are operating sufficiently close together to permit close coordination by the division. Do not get the idea from this diagram that the howitzers will be behind the light guns. They may be at the same distance from the front and in overlapping position areas.

In order to facilitate close contact between the corresponding infantry and artillery commanders, it is desirable to have their command posts as close together as practicable. For example, on this chart the command posts of division and of the field artillery brigade are shown at the same place or close together. This is habitual. The headquarters of the light regiments can usually be near those of the infantry brigade they support. Often in the lower echelons—the light artillery battalion and the infantry regiment—command requirements will not permit the placing of the two command posts in the same location. However, they are, in any case, connected by telephone and the required contact is furthered by visits and by having the artillery commander keep a representative at the infantry command post.

When an artillery unit is in direct support of an infantry unit, its normal zone is in the zone of action of that infantry unit. By the term "normal zone" we mean the area for which an artillery unit is normally responsible and within which its fire is normally directed. A "contingent zone" is an area, outside of the normal zone, in which an artillery unit may be called upon by higher authority to fire under certain contingencies. For example, the normal zone of the 2d Battalion 1st Field Artillery is the zone of action of the 2d Infantry. This battalion may be assigned a contingent zone to the right or left of this zone, or both. It would be directed to be able to fire on targets as far to the right as this line, or for two of its batteries to be able to do so, and its positions would be selected so as to permit this fire.

It is a principle that we favor the main attack strongly in artillery support; but a brigade making a holding attack will usually operate over a wide front and in addition will be required to mass sufficient strength for a principal effort on some part of this front. It will usually need the support of one light regiment to carry out this mission. How then



4. ATTACK PHASE.—Now we will consider the attack phase. (See Chart No. 3.) Here we have a division operating with brigades abreast, 1st Brigade on the right, and the brigades with regiments abreast. How would the field artillery in this case be organized for attack? A light regiment

can we favor the main attack? By assigning a contingent zone on the front of the main attack to the light regiment supporting the holding attack. Then at critical times, from the division viewpoint, this regiment can be required to fire on this part of the front. The howitzers, although able to cover the major part or all of the division front, can be required to be able to place the bulk of their reinforcing fires to assist the main attack. In this way practically all the artillery may be prepared to mass its fire on the decisive part of the front.

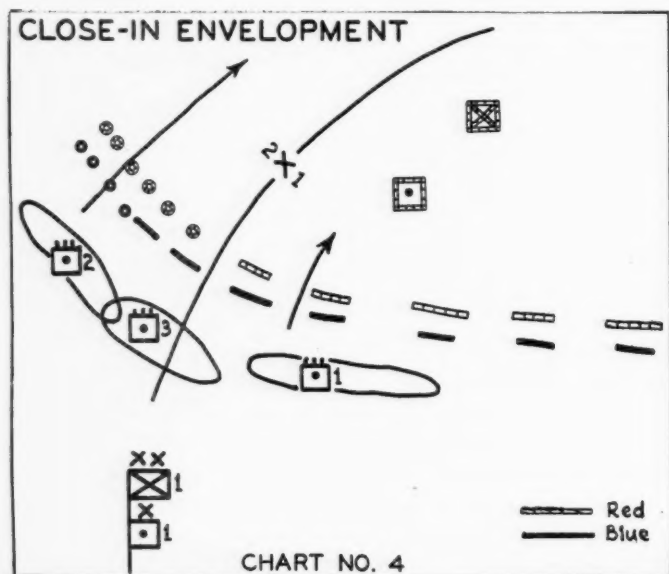
In division orders you will frequently notice instructions for the artillery to be able to mass (or concentrate) its fire in certain rather large areas such as the zone of the main attack or on some important terrain feature. This does not mean that the artillery is to be able to neutralize this entire area at any particular time but that most of the guns will be able to fire at one time on any target which may be located in this area, in accordance with the development of the situation and the desires of the division commander. Then they will occupy positions which will give effective ranges to this area and seek observation of it.

Let us now consider the employment of the field artillery of an independent division in open warfare in three forms of the attack.

a. First, the *penetration*. Suppose that in this case the division commander has decided to attack, penetrating the hostile position generally along the boundary between brigades. Where should the mass of artillery fire be placed? On the front of penetration and also on its shoulders.

Because of the strength of the defense against a frontal attack, with consequent heavy losses, a strong superiority of artillery fire will usually be necessary on the front of penetration. Therefore, artillery reinforcements will often be required.

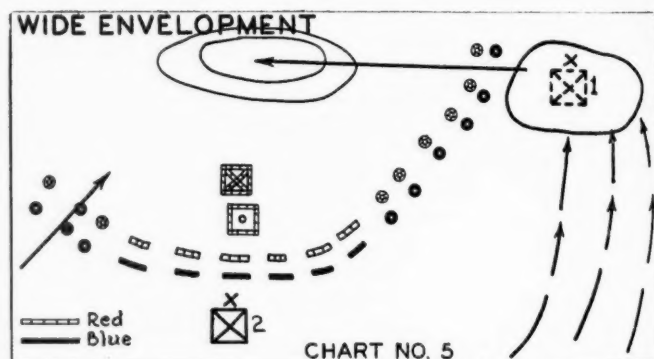
We must be sure that provision is made to cover adequately the shoulders of a penetration. Enemy flanking fire from these shoulders must be neutralized. Also, it is from the flanks of the penetration that counterattacks will probably be launched and the artillery must be prepared to break up such counterattacks.



Through the assignment of support missions and contingent zones, the higher commander controls the means for massing fire on appropriate targets to assist the main attack.

b. *Close-in envelopment*.—Chart No. 4 shows a close-in envelopment, with the 2d Brigade making the main attack, enveloping the hostile right flank and seeking to avoid the enemy's organized position; and the 1st Brigade making the holding attack. Should any of the artillery be attached in this situation? No. As in the penetration, the infantry brigades are operating close together and coordination of their efforts by the division commander is very desirable. In the same way coordination of artillery support should be obtained. Because of the short distances existing between the field artillery brigade command post and the command posts of the field artillery regiments, signal communications will usually be such that control by the brigade will be practicable. (One light regiment in direct support of each infantry brigade and the howitzers in general support.)

From the artillery viewpoint it is more desirable to have the principal effort of the holding attack near the boundary between brigades since, if so located, it will be easier to mass artillery fire in support of either this attack or the main attack. The bulk of the artillery can be more centrally located.



c. *Wide envelopment*.—Chart No. 5 shows a wide envelopment with the 2d Brigade making the holding attack, with the principal effort on the left in order to attract reserves away from the front of the main attack; the 1st Brigade, and other elements of the enveloping force, moving usually under cover of darkness to the area from which the main attack is to be launched. This attack avoids the enemy's organized position, artillery and reserves, and strikes toward an objective in rear—a vital terrain feature, possession of which will disorganize the defense and make the position untenable.

Is it practicable to keep all the artillery under division control in this case? No. Ordinarily the enveloping force is at such distance from the holding-attack force that such control of all the artillery is not practicable, and it will be necessary to attach a part of it.

This attachment may be to the enveloping force, or to the holding-attack force, depending on the location of the division commander. For example, in the situation where the bulk of the division constitutes the enveloping force, the division command post will usually be located so as to permit the division commander to control closely the action of this force. Then the artillery with the enveloping force should be kept under division control and that with the holding

attack be attached to the unit making that attack. At least one light regiment and one howitzer battalion will usually be required by the holding attack for the following reasons: the holding attack covers a wide front and artillery support is needed to obtain the necessary fire power; generally it must execute all of the necessary fires from the time the enveloping force artillery moves out until the following morning when the attack is launched; strong artillery support will assist in deceiving the enemy as to the location of the main attack; the principal effort of the holding attack should have good support in order to make sufficient advance to hold and attract enemy reserves; and to execute counter-battery, and interdict movement of enemy elements especially towards the front of the enveloping force. This is generally true even though the holding attack force is less than a full brigade. For the reasons I just gave, a battalion of light artillery is not enough so a regiment is generally used.

If this allotment is made to the holding attack, the artillery brigade less one light regiment and one howitzer battalion is available to accompany and support the enveloping force. This arrangement avoids the breaking-up of combat teams and favors the main attack to some extent (by one howitzer battalion and the assistance that the artillery with the holding attack can give).

While every effort should be made to gain surprise for the main attack, we can expect that sooner or later the enemy will oppose in strength any threat to his flank and rear. He will probably move both infantry and artillery elements to this part of the front as soon as the threat is discovered. When such opposition develops, strong artillery support (both light and medium) should be available to furnish the necessary power.

It is rarely that good howitzer support on the front of the enveloping force could be given from positions in rear of the holding attack because of the difficulties of observation, liaison, communications, and range. It must be remembered that the envelopment will often be extended during the attack, increasing the difficulties just mentioned.

In a division having one horse-drawn and one truck-drawn light regiment, it usually makes little difference, from the viewpoint of mobility, which of these accompanies the enveloping force. The most important thing is to keep combat teams intact if there is no good reason for changing them.

If the artillery is to fire effectively at dawn, it should have had opportunity during daylight the previous day for reconnaissance and orientation. Preferably it should have at least two hours for this.

If there is no opportunity for daylight reconnaissance, some orientation measures may be accomplished during the night, but some time should be allowed after dawn for their completion, in order to permit effective fire. Therefore such an attack should start some time after dawn.

Initially, few targets within effective range of the artillery with the enveloping force may be known. In this case, some of the artillery may be held in readiness, to advance close behind the attack and take suitable positions as soon as appropriate targets are discovered.

d. Conduct of the attack.—The plan includes a series of concentrations to be placed on hostile front-line elements and on successive localities in rear where it is known or sus-

pected that hostile resistance can fire effectively on our troops as they advance. These include hostile observation and batteries. If the attack is closely coordinated, concentrations may be fired successively on a time schedule based on the expected rate of advance of the infantry. However, as the attack progresses, it will be found that on certain parts of the front our infantry has been stopped or is progressing more slowly than expected. Changes in the time schedule must then be arranged between corresponding infantry and artillery commanders. More commonly, in open warfare situations, fire is lifted from a concentration area to the next one beyond on signal from the infantry when they are ready to advance into the area it covers. The signal may be given by the artillery liaison officer by radio, or by a prearranged signal visible to the artillery observers. More rarely, ground or air observers can see and report the advance of the infantry. As the attack progresses, we will find that fire is needed on areas or targets which could not be foreseen prior to the attack. These must be taken under fire, even though it means shifting from or delaying fire on prearranged concentrations. Some batteries must be prepared to fire with airplane or balloon observation or on new visible targets which appear. There will be times when our infantry, after capturing certain objectives, will have to hold while reorganization takes place. During such periods the artillery must be prepared to put down protective fires to assist the infantry in retaining the ground gained. All artillery commanders from the battalion up must be prepared to mass their fire on critical parts of the front on short notice.

As the attack progresses, artillery observation and reconnaissance are pushed forward with it. Before the leading elements of the attack reach the limit of the effective range of their supporting artillery, some of that artillery must have been displaced forward if continuous support is to be given. The distance of forward displacement averages, in general, about half of the effective range. Light battalions generally displace one battery, the other two displacing when the leading one has taken over the firing missions, in order to give continuous support, or they may displace one battery at a time. Howitzer battalions can generally displace by battalion. Reconnaissance and orientation are started before displacement, and displacements are made rapidly and fire resumed promptly.

As soon as the attack reaches ground important to the enemy in the defense of his position, we may expect counterattacks. The artillery must be prepared to place concentrations to protect our infantry in this case. It is desirable to bring down strong artillery fire on any enemy troops which are forming for a counterattack. If lack of information prevents this, then defensive concentrations are placed to break up the enemy attack before it reaches our infantry. Local counterattacks may be taken care of by the light artillery supporting the infantry unit concerned. On the other hand, the bulk of the artillery brigade may be required to break up a counterattack which threatens ground vital to the success to our attack.

5. REINFORCING ARTILLERY.—The organic artillery of the infantry division, consisting of a brigade of two light and one medium artillery regiments, is the minimum amount of supporting artillery considered necessary under normal conditions. In many cases additional artillery support is

needed, especially in attack. This artillery is furnished from the GHQ reserve which is a pool for that purpose, or from the corps or units in reserve. All reinforcing *light* artillery is generally attached to divisions, and sometimes medium artillery is attached. The attached artillery comes under the command of the artillery brigade commander, and is handled as artillery of the brigade as long as it is attached. The existing combat-team arrangement is disturbed as little as possible. If a regiment of light artillery is attached to the division in this case (Chart No. 5) and the division commander wishes to use it to strengthen the main attack, it would be combined with the 1st Field Artillery which is in direct support of the 1st Brigade, and the senior colonel would command the combination or groupment of the 1st Field Artillery and the attached regiment. If the 1st Brigade uses regiments abreast, the 1st Battalion, 1st Field Artillery would normally support the 1st Infantry, and the 2d Battalion the 2d Infantry. In this case one battalion of the attached regiment might reinforce each of the battalions of the 1st Field Artillery, or be combined with them, forming groupments under the senior battalion commander.

Sometimes the reinforcing artillery might fire special missions, but normally it would help execute the direct support fires arranged by the infantry and organic artillery commanders. Preferably most of its fires would be schedule fires and the contingent missions of the organic artillery. It would not ordinarily establish liaison with the infantry, but with the headquarters of the artillery unit to which it is attached.

If only one regiment is in line, the organic regiment should be in direct support, the attached regiment should reinforce its fire and be prepared to give direct support to the reserve regiment when it is committed.

Similarly, reinforcing medium artillery would form a groupment with the organic medium regiment, under the colonel of that regiment, who would assign some of its missions to the reinforcing unit; or it might be handled as an additional unit of the brigade, on a separate part of the front or on a separate class of missions.

6. SUMMARY.—To summarize the employment of division artillery in development and attack:

- a. The sole mission of the artillery is to give the required fire support to the infantry.
- b. In development, the artillery gives prompt support to covering forces to the extent necessary, often with its full strength.
- c. Strength is given to the artillery support of the division main effort, mainly by the provision for massing artillery fires in critical areas of that effort.
- d. Whenever practicable, the light regiments are placed in direct support of infantry brigades, and the howitzer regiment kept in general support.
- e. Combat teams—one battalion of light artillery supporting the same infantry regiment, and one regiment of light artillery supporting the same infantry brigade—are maintained as far as practicable.

Division Engineers — Characteristics, Organization and Equipment

BY LIEUTENANT COLONEL L. E. OLIVER, *Corps of Engineers*

Purpose	1
Mission	2
Function	3
Characteristics of engineer work	4
Relation to other arms	5
Assignment of engineers	6
Classification of engineers	7
Engineer combat regiment	8

1. PURPOSE.—This paper will be devoted to a discussion of the engineer combat regiment, which is an organic part of the infantry division. The purpose is to give you such knowledge of the combat regiment as will enable one to understand the part it plays in the division team. It is hoped that the general effect will be to give a picture of the engineer regiment which will assist you as a commander or staff officer to use it properly. As a background for the discussion we shall first cover briefly the broad picture of engineer functions in the theater of operations.

2. MISSION.—The mission of engineers in war is to assist the operations of the field forces by means of engineering works. Let me emphasize this by saying it again in somewhat different language. The job of the engineers is

to assist the other troops in the field, and they do this by performing work.

3. FUNCTION.—a. As has been brought out in many military studies, campaigns and battles are won by a combination of movement and fire power. By means of movement the skillful commander, regardless of how the total force available to him compares in size with that of the enemy, manages to achieve fire superiority at the critical time and place. Most of the tasks upon which engineers of all echelons in the theater of operations are engaged are for the purpose of facilitating the movement of friendly troops and their supplies. Movement of friendly troops may be facilitated directly, as when a bridge is constructed or a landing field is prepared for the air service; indirectly as through the furnishing of maps; or in a relative sense, such as through demolitions or road blocks which impede the movement of the enemy and thereby relatively improve the movement of our own forces.

b. Most of the other duties of engineers consists of providing shelter, operating utilities such as water or electric light plants, or otherwise contributing to the health and comfort of the troops.

c. Another function of engineers is combat. All engineer units are armed with the rifle and division engineers are armed also with the automatic rifle and machine gun and are partially trained as infantry. They can give a good account of themselves in combat but can in general assist their team more through the execution of engineering work.

4. **CHARACTERISTICS OF ENGINEER WORK.**—Peace-time engineering is characterized by permanence of structures and economy in construction. Military engineering in war is characterized by economy, not in money, but in time. There is almost always a veritable race going on to get essential engineer work done in time to serve its purpose, and this may entail a rather lavish use of men. There is almost always a shortage of materials which requires that structures be reduced to the bare minimum of strength and durability. Priorities have to be established and non-essential work eliminated altogether. The prime requisite of any engineer work is that it be completed in time to meet the need of the troops.

5. **RELATION TO OTHER ARMS.**—On the staff of every unit to which engineer troops are assigned there is an engineer officer known as the unit engineer. He has a dual function. As a member of the special staff he advises the unit commander in matters of an engineering nature and makes inspections to see that the desires of the unit commander with respect to engineering matters are carried out. He is also a troop commander. He commands all engineer troops assigned or attached to the unit which have not been assigned or attached to subordinate units. In the division this officer is known as the division engineer; in the corps he is the corps engineer, in the army he is the army engineer, in the theater of operations he is the chief engineer.

While the unit engineer has access to the unit commander in important matters, in routine matters he deals with members of the general staff. He deals with G-2 in matters relating to the preparation and distribution of maps; with G-3 in matters relating to organization of the ground, and the tactical employment of engineer troops including the use of engineers on security missions, in the execution of demolitions and obstructions, and in combat; and with G-4 in matters of engineer supply and construction. Work required on routes of communication designed to facilitate the movement of combat troops is the concern primarily of G-3, while that on routes for use of supply columns is the concern of G-4.

6. **ASSIGNMENT OF ENGINEERS.**—Engineer troops form an organic part of divisions and all higher echelons. They may be attached to smaller units for a particular operation. Engineers of a well balanced force comprise about one-eighth of the total field forces. Of the entire engineer forces about 15% are with the divisions, about 25% with the corps, about 25% with the army, and about 35% with GHQ and the communications zone.

7. **CLASSIFICATION OF ENGINEERS.**—a. According to their place of service, engineer units are classed as divisional or non-divisional. Divisional engineers include the combat regiment, part of the infantry division, the squadron (motorized) belonging to the cavalry division, the squadron (mechanized) assigned to the mechanized division, and the troop (mechanized) assigned to the mechanized brigade. All other engineer units are non-divisional.

b. According to the work they perform engineer units are classed as general or special. General engineer units are those which are organized and equipped to do general engineer work, that is, to do most any kind of a job that may come up. They include all the divisional units and also, the General Service Regiment and the Separate Battalion, both of which are assigned to the corps, the army, GHQ reserve, and the communications zone. The General Service Regiment includes a large proportion of occupational specialists, and can do most any kind of work. The Separate Battalion includes a small number of occupational specialists and a large number of relatively unskilled laborers.

Special engineer units are those organized and equipped to do some special kind of work. A brief description of some of these units follows:

The Railway Battalion maintains and operates a railroad division, including usually about 100 miles of main line track. It has one maintenance of way company for maintenance of the track, one shop company for maintenance of the rolling stock, and one operating company which runs the trains. New railroad construction, restoration, and unusually heavy maintenance are performed by general engineer troops, chiefly the general service regiment and separate battalion.

The Railway Shop Company does shop work that is too heavy for the shop company of the Railway Battalion. This company does regular repair work such as would be done in a big railway shop in civilian practice, while the work of the shop company that is included in the railway battalion would correspond to the operation of a roundhouse at the railway division terminal.

The Topographic Battalion, as its name implies, assists in the provision of maps, map substitutes, and other topographic data. It is organized for surveying, for the preparation of maps or map substitutes from aerial photographs, and for the reproduction of maps, aerial photographs and mosaics by lithography.

The Water Supply Battalion has a large number of tank trucks with which it delivers water to water distributing points in situations which require this. It is solely a water purification and transportation agency. If the repair of a city waterworks or the installation of a new water supply system is required, this work will be done by a general engineer unit, usually a general service regiment.

The Camouflage Battalion (Army) performs a certain amount of camouflage work for army headquarters. Its chief function though is to maintain camouflage technique within the army by conducting camouflage schools, inspecting camouflage installations, etc.

The Camouflage Battalion (GHQ) is solely a manufacturing concern. It makes camouflage materials for use throughout the theater of operations.

The Heavy Ponton Battalion is a unit of our heaviest floating bridge equipment, the 23-ton bridge.

The Light Ponton Company is a unit of our light floating bridge equipment, the 7½-ton bridge.

The Bridge Train (animal-drawn) is a unit of the old civil war type of floating bridge.

The personnel of these ponton units do not construct bridges. The personnel is sufficient only to take care of the equipment and to move it from place to place as required.

A general engineer unit will be called upon to construct the bridge.

The Depot Company operates engineer depots. The Dump Truck Company furnishes trucks as required for hauling engineer materials. The Shop Company is equipped to manufacture or repair items of engineer equipment.

General engineer troops comprise about four-fifths of all engineer troops in the theater of operations; special engineer troops about one-fifth.

8. ENGINEER COMBAT REGIMENT.—*a.* This study deals principally with the combat regiment which forms part of the infantry division. We shall cover its organization, transportation and equipment, and its duties in a general way only.

b. All engineer units are built up from the fundamental grouping of men, tools and materials into the smallest engineer work unit. In the engineer combat regiment this is the platoon of four squads. The platoon is divided into a headquarters, an operating section, and a tool section. The operating section consists of two sergeants who are construction foremen, in addition to the four squads. The four squads include several carpenters, some general mechanics, an electrician, a demolition man, a rigger, and a number of laborers who are trained in the use of the ordinary pioneer and carpenter tools and each of whom usually has some useful specialty. The headquarters includes a lieutenant who commands, a staff sergeant who is platoon chief, a bugler, a demolition man, a bridge carpenter, and a rigger. The tool section consists of a tool corporal, a chauffer, a one-and-one-half ton dump truck, and a load of tools. The tools consist of four sets, pioneer, carpentry, demolition, and sketching. The pioneer equipment includes suitable numbers of such tools as shovels, picks, axes, crow bars, drills, sledge hammers, saws, jacks, snatch blocks and wrenches and a limited amount of supplies such as rope, nails and drift bolts. There are enough tools to keep the four squads busy at one time on digging, cutting and clearing, wrecking, rigging, or rough carpentry such as bridge construction. For extensive road work the platoon tools must be supplemented by other equipment such as wheelbarrows, slip scrapers, road drags or graders from company or regimental headquarters.

The carpentry equipment, supplemented by carpenter tools from the pioneer set, is sufficient to keep the entire platoon employed at one time on carpenter work such as construction of a warehouse or hospital.

The demolition set includes a magneto exploder with wire reel and a supply of electric blasting caps, a supply of instantaneous and of time fuse with non-electric blasting caps, necessary tools such as pliers and crimpers, and 200 lbs of TNT. The tools required in preparing for the charges are obtained from the pioneer or carpenter sets. If the platoon is to be employed on extensive demolition work it must be provided with additional TNT, fuse, and caps.

The tools are all packed in boxes which are unloaded near the site of the work to be done and the dump truck is then used to transport materials. The tool truck accompanies the platoon at all times except when it is engaged in combat.

The platoon armament includes two automatic rifles which are normally carried in the tool truck. Otherwise the men are armed with the rifle or pistol.

Note that this platoon is intended to be employed as a unit. Having only one truck for transportation of tools it can not be employed on two or more widely separated jobs unless one or more additional trucks are furnished it by company or regimental headquarters. If additional trucks are provided, it can readily be divided into two or more work groups.

c. The lettered company consists of a headquarters and two platoons. The company headquarters includes the company commander, a lieutenant, the usual administrative and supply personnel, a staff sergeant who is a construction foreman, two sergeants who are foremen, a tool corporal, a blacksmith, a carpenter, and a draftsman.

The company transportation includes a one-and-a-half ton cargo truck for kitchen and water, a one-and-a-half ton dump truck for rations and baggage, a similar truck carrying company tools, and a half-ton pick-up truck for reconnaissance and for emergency work.

The equipment carried in the tool truck includes a blacksmith set, drafting set, illuminating set, photographic set, sign painting set, tinsmith's set, duplicator map reproduction set, reserve carpentry set, reserve pioneer set, pipe fitting set, and sketching outfit.

The loads of the company tool truck and the ration and baggage truck are habitually unloaded at the company bivouac or the site of the work and the two dump trucks are then used to supplement the platoon tool truck in hauling engineer materials. The most usual loads are gravel or stone for road surfacing or timber for bridge or building construction.

The pick-up truck is the only transportation within the company available for engineer reconnaissance. Ordinarily, when the company is assigned a job by the battalion commander, the company commander and the two platoon commanders will go immediately in the pick-up truck to the location of the job to reconnoiter, size up the situation, and decide how the job is to be assigned and performed, while the company is moved to the new site by the second in command. By the time the company arrives at the site, the company commander has assigned tasks to each platoon leader and each platoon leader has planned his job and is ready to start his platoon to work at once. This truck may also be used to haul small items of equipment or supply, or send out a very small detail on some urgent mission such as a small demolition job.

d. The battalion is a tactical unit, having no administrative functions. It comprises three lettered companies and a small headquarters designed to assist the battalion commander in the supervision of all work which the various companies of the battalion are performing. The battalion headquarters has no special equipment and its only transportation is a one-half ton pick-up truck, used primarily for engineer reconnaissance. If the battalion commander has to supervise tasks that are spread over a large area he can usually obtain additional transportation from regimental headquarters.

Having no administrative or staff duties, the battalion commander is able to devote his entire time to the supervision of the work of his three companies. The division engineer will generally turn over to the battalion commander the control of all engineer work within a given area. Regi-

mental headquarters will take care of administration and supply and will leave the detailed assignment and control of the actual work largely to the battalion commander.

e. The combat regiment is both an administrative and a tactical unit. It includes two battalions, a band, and a headquarters and service company. There is also an attached medical detachment.

The Headquarters and Service Company consists of a headquarters platoon and a service platoon.

The headquarters platoon includes five sections. This division engineer section includes an officer and a few men who assist the division engineer in performing his functions as a special staff officer. The officer and one of the enlisted men are especially qualified in camouflage work. If the regimental headquarters is located at any distance from division headquarters, this section will be located at division headquarters.

The S-1 Section has the usual administrative functions. The map section not only performs the usual intelligence functions for the regiment but produces maps, overlays, sketches, etc., for the division. The operations section performs the usual duties of such a section. The supply section takes care of matters of regimental supply and also handles supply of engineer materials and equipment, other than maps, for the division.

f. Having gone over the organization and equipment of the combat engineer regiment, let us now consider briefly the duties that they may be called upon to perform.

Assistance to other arms in stream crossings is one of the most important engineer duties. Other natural obstacles which may require engineer assistance are swamps or other soft ground over which some sort of roadway such as corduroy may have to be constructed for artillery and other vehicles, deep ravines or gullies which may require bridging, or more probably the construction of ramps for ingress and egress, steep hills which may require a side hill cut to reduce the grade, or heavy growths of timber or brush through which a path may have to be cut for the passage of combat vehicles.

Artificial obstacles may be most any kind of demolition or road block.

In defensive operations one of the most important engineer duties is the supply of engineer tools and materials. The complete organization of a division defensive sector will require several hundred tons of such materials as barbed wire, stakes, lumber, wire netting, etc. While the bulk of the work will always be done by the troops who are to occupy the position, the engineers may be required to construct CPs, OPs, shelters, and other special works.

Positions will generally be laid out by the troops who are to occupy them. In some situation, particularly when it is known that a rearward position will be occupied in the near future, the engineers may be directed to lay out this position and organize it insofar as available time will permit.

Camouflage is a routine duty of all troops. The engineers supply camouflage materials and may do camouflage work around division headquarters.

Motorization and mechanization have made demolition and obstruction on routes of communication one of increasingly important duties of the division engineers. Motorized or mechanized forces can move so rapidly and so far, over

good roads, that in many situations the flank or line of communications of a force can be effectively protected only through the use of such means. While they are classified here under the defensive, your attention is called to the fact that they may be used equally well when the mission of our own force is offensive. The flanks and line of communications can be protected by a small force of infantry or cavalry or engineers defending road blocks or demolitions when otherwise so large a force would be required for this purpose that the force available for the attack mission would be unduly weakened.

The division engineers will do a great deal of work on the maintenance and repair of roads and the construction of turn-arounds to aid traffic circulation. New construction which is at all heavy or extensive will usually be performed by corps or army engineers. The extensive motorization of our army has tended to increase the engineer road maintenance task, but at the same time the improvement in motor vehicles and especially the adoption of the large balloon tire has tended to make our task easier. On the whole the engineer job in this respect is now about the same as formerly, except that much greater speed in doing our work will be demanded in the future.

Division engineers may at times be employed on the rehabilitation of railroads, but such use will be unusual. Railroad rehabilitation and construction will generally be performed by engineers of the army or the communications zone.

Many of the supplies for which the engineers are responsible, such as gravel or stone for road surfacing, lumber for bridge and building construction, barbed wire and stakes for the organization of the ground, are heavy and bulky and difficult to transport for any considerable distance. They are commercial items which may be found within the theater of operations. The engineers should make the utmost use of all local resources. They may even organize special engineer units to exploit local resources as, for instance, in France during the World War where forestry units were organized to cut timber and mill it for the use of the army.

The engineers rehabilitate and operate local utilities within the theater of operations such as electric power plants, gas plants, and water supply systems. In doing this they utilize, insofar as possible, the civilian personnel who operated these establishments during peace. Work of this character is more likely to be performed by corps or army engineers, but it may fall to the lot of the division engineers.

A duty classed here as routine but which must be given careful attention, is engineer reconnaissance. The varied duties of a division engineer indicate that it is most essential that he keep informed at all times regarding most everything that pertains to the area within which his division is operating. He must be thoroughly acquainted with the terrain including configuration of the ground, location and character of streams, and location and character of woods. He must be well acquainted with roads and their condition. He must know about all the local resources such as gravel pits or quarries, lumber yards, sawmills, hardware stores, power plants, water supply installations, etc. He must locate all equipment which may be useful in engineer work such as road graders, plows, scrapers, tractors, teams, etc. He must know the location and condition of buildings that may be used

for shelter, storage or hospitalization, or that may be demolished to furnish timber or stone for engineer work. He must know where demolitions or road blocks will most effectively hinder a hostile motorized or mechanized force operating on the flank or rear of his division. To obtain all this knowledge requires constant reconnaissance by all engineer echelons which must keep the regimental headquarters informed at all times as to conditions and engineer resources within the area in which they are working.

It is routine for the division engineers to post road signs indicating the direction to division establishments. A great deal of lost time and effort can be saved to everyone, as we all well know in this day, by the proper use of road signs.

Mapping and map reproduction are done chiefly by the Topographic Battalion. About all that can be done within the combat regiment is to correct existing maps and to work out a limited quantity of overlays and sketches for division use.

There will be little opportunity for construction of shelter and storage facilities by the combat engineers in a campaign of movement. Such construction by division engineers will likely be limited largely to stabilized situations or to periods when located in rest or training areas.

Construction of landing fields by division engineers will be limited generally to a small amount of clearing to make an otherwise suitable site available as an emergency landing field.

We come now to a consideration of the use of the engineer regiment in combat. When we speak of the use of the regiment in combat we normally have a picture of the whole regiment being assembled and used as a unit, taking the place of an infantry battalion. The regiment has about the same number of men, the same number of rifles and the same number of pistols as an infantry battalion. It has only about half as many automatic rifles.

It has no machine gun carts, no ammunition carts, and no grenade dischargers. It is not so well trained for combat as the infantry battalion. It has no training at all in use with the usual infantry supporting weapons, artillery, 81-mm

mortars and tanks. It is not therefore, at its best, the equal of an infantry battalion in combat. To expect it, after the men have been busy all day on engineer work to assemble, issue ammunition, march several miles, and then do the work that would be expected of a fresh infantry battalion, is expecting too much. I don't wish to leave the impression that the regiment will not give a good account of itself. It is known from actual experience that engineers can fight pretty well, as they frequently demonstrated in France. But I do wish you to know the actual handicaps under which they fight.

Moreover, it should be understood that when the regiment is assembled for combat all engineer work stops, and will remain stopped for several hours as a minimum. Therefore, that the use of the regiment as a unit in combat will be quite exceptional and will take place only as a last resort.

This does not mean that the men will seldom take part in combat. Many of their duties as we have just been considering them, will bring them into contact with the enemy. Probably their participation in combat in small groups will be more frequent in the future than in the past, due to the increasing use of the engineers in constructing and defending demolitions and other road blocks out on the flanks where the enemy is quite likely to be met.

g. In conclusion, I would like to leave with you this thought. The Combat Regiment can assist the division in innumerable ways. It can help maintain the health and morale of the division in training areas; it can help the division to move rapidly so as to accept battle only under favorable conditions; it can help it to avoid losses in battle; and finally it can participate in the combat. Most of its work requires a considerable amount of advance planning. The attachment of special engineer troops may be required; special equipment may be needed; large stocks of engineer materials may have to be brought in. For the work of the regiment to be of the greatest possible value you can readily see that the division engineer must have the full confidence of the division commander and the general staff, and he must be kept informed at all times regarding operations that are in prospect for the division.

Directory of Periodicals

Included in this directory are only those periodicals from which articles have been selected.
See also, "List of Periodicals Indexed and Key to Abbreviations."

MILITARY AND NAVY PERIODICALS

Joint Forces		PAGE	ENGINEERS		PAGE
Fighting Forces (Great Britain)		99	Military Engineer		107
Journal of the Royal United Service Institution (Great Britain)		102	Pioniere (Germany)		107
Journal of the United Service Institution of India (Great Britain—India)		102	Rassegna di Cultura Militare (Italy)		110
United Services Review (Great Britain)		118	Royal Engineers Journal (Great Britain)		118
General Military			INFANTRY		
Army Quarterly (Great Britain)		97	Infantry Journal		101
Bulletin Belge des Sciences Militaires (Belgium)		97	Revue d'Infanterie (France)		112
Canadian Defence Quarterly (Canada)		98	MEDICAL		
La France Militaire (France)		99	Army Medical Bulletin		97
Krasnaya Zvezda (Russia)		102	Journal of the Royal Army Medical Corps (Great Britain)		101
Militärwissenschaftliche Mitteilungen (Austria)		104	Military Surgeon		107
Militär-Wochenblatt (Germany)		105	ORDNANCE		
Reserve Officer		112	Army Ordnance		97
Revue Militaire Générale (France)		113	QUARTERMASTER		
Revue Militaire Suisse (Switzerland)		116	Quartermaster Review		110
Wehrtechnische Monatshefte (Germany)		118	SIGNALS		
Arms and Services			Signal Corps Bulletin		118
AIR ARM			TANKS		
Revue de l'Armée de l'Air (France)		112	Kraftfahrkampftruppe (Germany)		102
Royal Air Force Quarterly (Great Britain)		117	Royal Tank Corps Journal (Great Britain)		118
ARTILLERY			VETERINARY		
Coast Artillery Journal		99	Veterinary Bulletin		118
Field Artillery Journal		99	Navy and Marines		
Journal of the Royal Artillery (Great Britain)		101	Marine Corps Gazette		104
Rassegna di Cultura Militare (Italy)		110	Naval Institute Proceedings		107
CAVALRY					
Cavalry Journal		98			
Revue de Cavalerie (France)		112			
CHEMICAL SERVICE					
Chemical Warfare Bulletin		98			

Catalog of Selected Periodical Articles

This section catalogs the articles selected from Library periodicals for the current quarter. Periodicals in this Catalog are arranged alphabetically.

ARMY MEDICAL BULLETIN

October 1938

CAUSES OF DEATH: U.S. ARMY COMPARED WITH THE C.C.C.

ARMY ORDNANCE

January-February 1939

THE MILITARY ESTABLISHMENT. REPORT OF THE CHIEF OF STAFF FOR THE YEAR 1938. General Craig
ARMS FOR THE ARMY. WHAT WE HAVE AND WHAT WE NEED FOR ORDNANCE PREPAREDNESS. Major General Wesson
MANUFACTURE OF HIGH-SPEED TANKS. MANY INDUSTRIES FURNISH THE COMPONENT PARTS. Major Christmas
SMALL-ARMS AMMUNITION. MANUFACTURING PROCESSES USED AT THE FRANKFORD ARSENAL. Lieut. Colonel Hannum
WHAT CAN WE EXPECT OF ROCKETS? GUNLESS ARTILLERY AND LONG RANGES ARE POSSIBILITIES. Major Randolph, Ord-Res.

ARMY QUARTERLY (Great Britain)

January 1939

THE HINDENBURG LINE. Captain Wynne
THE INNER NATURE OF WAR. Lieut. Colonel Seton Hutchison

POLICY AND COMMAND IN THE AMERICAN CIVIL WAR, 1864-1865. (I) Major Sheppard
THE SOVIET-SPANISH WAR TO SEPTEMBER, 1938. Major-General Fuller

BULLETIN BELGE DES SCIENCES MILITAIRES (Belgium)

BY MAJOR E.M. BENITEZ, Coast Artillery Corps

July 1938

THE BEGINNING OF THE BELGIAN AIR FORCE.
[Pages d'histoire de l'Armée Belge au cours de la guerre 1914-1918. — Les débuts de l'aviation militaire belge.] (II) Major General Mathieu

A detailed account of the flights made by the Belgian Air Force from 1 to 26 August 1914. At this time there were four squadrons — of which three (1, 3 and 4) were based at Antwerp and the second based at Namur — comprising a total of 13 planes. Most of the flights were reconnaissance missions connected with the defense of the Belgian fortresses.

DETERMINATION OF BARRAGE CASUALTY COEFFICIENTS.

[Contribution à l'étude du barrage dans la défensive d'arrêt.] Major Simon

The author, through a theoretical study of casualties, arrives at a formula which gives the losses that are likely to occur among personnel and

tanks in a modern barrage. There are so many factors in war that defy calculation that such formulas have little practical value.

August 1938

THE BEGINNING OF THE BELGIAN AIR FORCE.

[Pages d'histoire de l'Armée Belge au cours de la guerre 1914-1918. — Les débuts de l'aviation militaire belge.] (III) Major General Mathieu

Second Period: 26 August-7 October 1914. The operations of the air force during this period were greatly hampered by bad weather. The machines were kept either in the open or in tent hangars. Most of the missions were of the reconnaissance type connected with the defense of Antwerp. Aviation, in general, performed valuable services.

BELGIAN ARTILLERY AND MOTORIZATION.

[L'Artillerie belge et la motorisation.] Lieutenant Crahay

When the World War broke out, the artillery of practically all armies was horse-drawn. Only the Germans and Austrians had some motorized siege artillery. The enormous weights of the 305-mm and 420-mm required tractors.

In order to engage these heavy guns, the Allies had to employ without delay heavier artillery which had to be tractor-drawn. All the 155-mm and the 220-mm guns were, in general, motorized.

The Belgian army had no heavy artillery and all its guns were horse-drawn. It was necessary to obtain French 155-mm and 200-mm cannon drawn by Latil tractors.

Practically all the artillery manufactured during the war was tractor-drawn, particularly anti-aircraft and portée artillery. By the end of the war all the Belgian heavy artillery, the anti-aircraft artillery and one group of 75-mm portée were motorized.

Lieutenant Crahay discusses the advantages and disadvantages of motorization and states that two new factors of modern war favor the motor to the horse: aerial attacks and the use of chemical gases. He concludes that while Belgian artillery is not yet altogether motorized, it has been realized more and more in recent years that this evolution seems inevitable.

September 1938

THE FIRST OF MY TWO MISSIONS IN RUSSIA DURING THE WORLD WAR.

[La première de mes deux missions en Russie pendant la guerre.] Lieut. General Semet

The author accompanied General de Ryckel as assistant when Belgium sent the first military mission to Russia in September 1914, and which terminated with the war on the Eastern Front. The second mission was sent when King Albert, in September 1915, put the machine gun corps at the disposal of the Russian army.

General Ryckel and General Semet travelled via England and Archangel, the only free port of Russia. Through Archangel and Murmansk, another port on the White Sea constructed during the war, Russia received all her supplies from the Allies.

The contrast between the war atmosphere of Belgium and conditions at Petrograd were remarkable. The peace-time luxury life of Petrograd continued, as if the war did not exist. Leaving this city, the mission reported to the Commander in Chief, Grand Duke Nicholas. Tall, slender, dry, concise in his manner of talking, the Grand Duke was an impressive personality.

The author recalls an episode which is interesting today. One day, the Japanese Ambassador, General Oba, was ordered to Japan. There were several high ranking officers in the Grand Duke's special car, among them General Ryckel, the British General Sir John Hamburgh Williams and others, when General Semet commented on the remarkable progress that General Oba had made in the Russian language. "Do you believe that Japan is going to send us an attaché who does not know Russian," said General Daniloff, the Quartermaster General GHQ. According to General Daniloff, General Oba had been acting as if he did not know Russian, which language he spoke perfectly. The Japanese deceived the Europeans, but could not fool the Russians.

The disaster of Tannenberg was concealed from the foreign attachés. When the Emperor visited the Grand Duke, so many elaborate precautions were taken that Nicholas was practically a prisoner.

The author returned in 1915 with General Pau who was returning from a French mission to Russia and Bulgaria.

THE BEGINNING OF THE BELGIAN AIR FORCE.

[Pages d'histoire de l'Armée Belge: Les débuts de l'aviation militaire belge.] (IV) Major General Mathieu

This instalment covers the retreat of the Belgian army to the Yser, the Battle of the Yser and the stabilization of the front. As soon as the fall of Antwerp became imminent, the aviation depot was transferred to Ostend and then to Dunkerque. Bad weather handicapped operations and caused many losses of machines, which were replaced by the French.

During October and December 1914, aviation was particularly useful observing the result of inundations, and transmitting information which could not have been obtained otherwise. Spotting for artillery was also carried out. However, the number of pilots and machines available was too small compared with the requirements. The Company of Aviators was disbanded in 1915 and the Air Service was reorganized on a larger scale.

THE 2D AND 5TH REGIMENTS OF DISMOUNTED CHASSEURS IN THEIR SORTIE FROM ANTWERP 25 AND 26 AUGUST 1914.

[Les 2e et 5e Régiments de Chasseurs à pied à la première sortie d'Anvers (25 et 26 août 1914).] Lieut. Colonel Couvreur

The 2d and 5th Chasseurs formed part of the advanced guard of the Belgian 1st and 5th Divisions, respectively. At this time, the operations of the Belgian army were open warfare and the primary mission was to harass the lines of communications of von Kluck's army. The gallant exploit of Corporal Tresignies of the 2d Chasseurs, who was killed within sight of his comrades while trying to lower a drawbridge over the Willebroek Canal, is described in detail. This brave soldier swam the canal and reached the enemy side, but was killed while turning the wheel of the bridge lowering apparatus.

THE AUTOGIRO.

[L'autogiro.] Colonel Desmet

The autogiro and the helicopter belong to the same family but have essentially different characteristics. In the autogiro, as in the airplane, the traction is obtained by a vertical propeller rotated by a motor, while the lift is obtained by a horizontal propeller which rotates as a result of the current of air caused by the vertical propeller. In the helicopter, both traction and lift are secured by a horizontal propeller mounted on the shaft of a motor and there is no vertical propeller.

The development of these types of machines has been neglected, in fact, they are from 25 to 30 years behind the airplane.

The advantages of the autogiro are:

(a) Low speed.—The manufacturers give its minimum speed as from 15 to 20 miles per hour; actually, it is about 25 miles as otherwise the machine loses altitude.

(b) Can take off and land on a comparatively small space.

(c) Being capable of practically standing still, it is suitable for observation missions, and can easily drop or pick up messages from the ground.

(d) Safety when flying low, because the pilot has time to evade obstacles, and fly over or around them.

(e) If the pilot gets lost, he can easily come close to the ground, read the name of the town, railroad station, or drop and receive messages from the ground.

(f) It can be easily handled and can make sharp turns.

(g) The vertical propeller can be folded and the plane can be easily towed by an automobile.

(h) Being slow, the pilot does not have to be on the alert constantly, and the plane can even be landed taking advantage of atmospheric currents alone.

The disadvantages are:

(a) The greatest disadvantage is that the autogiro cannot lift heavy weights.

(b) It has a large dead firing angle because no method has yet been devised to fire through the horizontal propeller.

(c) Due to its low speed, it offers a splendid target for small arms when flying at low altitude.

The autogiro is specially suitable for close reconnaissance, particularly in a war of movement. It is superior to the observation balloon, because it can quickly land, render oral reports, and again take off. It is also particularly suitable for aerial photographs and for liaison between the echelons of the command and during combat. Due to its small lifting capacity, 100 kilograms (220 pounds) is the heaviest bomb that can be carried.

Military autogiros are undergoing experimentation in England, Belgium, the United States and in France where the artillery in particular is greatly interested. Germany has inclined to the helicopter, but without waiting for the tests which are being carried out, the German army has already developed an observation plane, the minimum speed of which is just about the same as that of the autogiro.

CANADIAN DEFENCE QUARTERLY (Canada)

January 1939

A NATIONAL DEFENCE PROGRAMME FOR THE UNITED STATES
BRITISH FOREIGN POLICY. By the Right Honourable Neville Chamberlain
WHAT PRICE ASSAULT WITHOUT SUPPORT. Captain Simmonds
OIL SUPPLIES IN TIME OF WAR. Colonel Letson

CAVALRY JOURNAL

November-December 1938

MECHANIZED CAVALRY HAS COME TO STAY. Colonel Stewart, Late 15th Lancers, Indian Army
PROPAGANDA AND THE NEWS. Smith

January-February 1939

WHAT OF THE FUTURE? Major General Herr
WHAT DOES PALESTINE PROVE? Captain Marochetti
CAVALRY OPERATIONS IN SPAIN. Major Benitez
WOUNDED KNEE — A LOOK AT THE RECORD. Brigadier General Scott

CHEMICAL WARFARE BULLETIN

January 1939

ENGINEERS IN CHEMICAL WARFARE. Major Heavey
NATURAL RUBBER SOURCES IN NORTH AMERICA. Lieutenant Sloan

COMBAT GASES AND THE GERMAN DOCTRINE. Lieut.Colonel Eugen, Rumanian Army

COAST ARTILLERY JOURNAL

November-December 1938

MERRY CHRISTMAS, 1776. Lieut.Colonel Azoy
JOINT AA-AIR CORPS EXERCISES. Colonel Bennett
THE LONG ROAD TO HANKOW. Lieutenant Rudolph

January-February 1939

THE BACKBONE OF SEA POWER. Major Benitez
THE NAVY AND THE COAST ARTILLERY. Admiral Leahy
BLACKOUT. Lieutenant Weber
LEADER AND LED. Major Phillips

FIELD ARTILLERY JOURNAL

November-December 1938

FITTING THE MEANS TO THE ENDS. Colonel Burleson

January-February 1939

WOUNDED KNEE — A LOOK AT THE RECORD. Brigadier General Scott
THE GERMAN ARTILLERY IN COMBAT. A translation from "Revue d'Artillerie" by Colonel R. McT. Pennell
COMMERCE A MODERN WAR. Colonel Lanza

FIGHTING FORCES (Great Britain)

December 1938

AN OBSERVER IN CZECHOSLOVAKIA DURING THE CRISIS. Captain Ravenhill
MARITIME OR CONTINENTAL? Commander Grenfell
WHAT MIGHT HAVE HAPPENED. By A.H.B.
ATLANTA. Lieut.Colonel Burne

February 1939

LIMITED LIABILITY WAR. Lieut.Colonel Burne

LA FRANCE MILITAIRE (France)

By MAJOR T.R. PHILLIPS, Coast Artillery Corps

27 July 1938

MOTORIZATION IN RUSSIA.
[La motorization en Russie.]

The magazine "Polska Zbrojna" has recently supplied some interesting indications on the development of motorization in Soviet Russia. It was in 1924 that the first effort was made to start the manufacture of motor trucks at Moscow and Iaroslavl. The attempts were discouraging because the industrial base was insufficient. From 1924 to 1928 there were constructed by year, 20, 80, 370, 505, and 671 motor trucks. But with the coming into effect of the first five-year plan, conditions were improved.

The three principal factories, Stalin at Moscow, Molotov at Gorki, and that of Iaroslavl produced between them during the period of this plan, 110,000 automobiles and 300,000 trucks. In spite of considerable losses due to failures of deliveries of basic materials and malfunctioning inevitable at the outset of such an enterprise, this was a solid base for further development. New factories were built at Oufa, Kouibichew, Kamiensk, and at Stalingrad. It was anticipated that a total production of 625,000 trucks a year would be practicable. But the provisions of the plan were not met; in 1937 only 200,000 trucks were produced.

At the end of the second five-year plan, the total number of trucks in the Soviet Union numbered 580,000, but it is necessary to make certain reserves, partially due to the limited value of these vehicles as well as to their short life. The life of a Soviet truck could be estimated at the maximum as three or four years. In Russia the material and its parts are strongly criticized and on the other hand, the truck manufacturers complain on their side of the poor quality of the semi-finished parts they receive from other factories. As a matter of fact, numbers of brand new trucks have to be turned in to repair depots. Russia also suffers from poor organization of gasoline and oil supply. Most of these stations are located at considerable distance from the principal highways. The second five-year plan contemplated the construction of 1,000 new gasoline stations. But because of the immensity of the Russian territory, these had almost no influence on the bad situation.

Another fact should be noticed: the assignment of thousands of trucks to social organizations for exclusively political missions does not permit the economical utilization of the Russian supply of automobiles. The trouble is increased because there are too few garages and repair depots, and Russia lacks specialized mechanics in repair. The result is that such repair depots as they have are practically swamped.

1 August 1938

THE SITUATION IN RUSSIA ACCORDING TO A GERMAN MAGAZINE.
[La situation en Russie d'après un journal allemand.]

The "Deutsche Wehr," in the 16 June issue, published some very interesting information on the situation in Russia. It deals with four subjects as follows:

- (1) The establishment of special schools separated from the military schools.
- (2) An estimate of the situation in Spain and China as seen by the Kremlin.
- (3) Some remarks on sabotage committed in Soviet factories.
- (4) A general estimate on the interior situation in Russia and its consequences.

SPECIAL SCHOOLS

A recent decree announced the immediate creation in the White Russian and Ukrainian Republics of special schools under the supervision of the Commissariat of National Education. The object of these schools is to give a superior education to the students who are admitted. These students include ten classes, and the professors will be chosen from the best in all Soviet Russia. They are expected to prepare students for entrance to military schools. The students who attend these schools, and who will later enter a military school, will have special privileges of promotion.

In a few years, then, a new corps of officers will be constituted in Russia with a higher level of instruction. The more radical civilians believe that this measure tends towards the constitution of a specialist officers' corps distinct from the corps now existing, with different interests, and that it will constitute a permanent menace for the Soviets.

SITUATION IN SPAIN AND IN CHINA FROM THE KREMLIN'S VIEWPOINT

It is generally believed at the Kremlin that the cause in Spain is lost and that the struggle is only being continued for reasons of prestige.

All the Red officers from Moscow who have been sent to the Spanish front declare unanimously on their return that without immediate and considerable support the Government cause is unmistakably lost. They speak plainly of the fatigue of the Reds and of the considerable weakening of discipline even in the international brigades.

The situation is judged differently in China, where, although military circles do not expect a victory, they are not pessimistic. Stalin and Kaganovich (this latter today second to Stalin and commonly called "the uncrowned King of the Kremlin") are of the opinion that it is not a question of defeat and that the victory will be gained by the fact that the Japanese Army will weaken itself in the numerous combats and that an attack on the Soviet Union in the near future is impossible. They believe, besides, that the longer the Japanese Army remains on Chinese soil the more damaging it will be to it.

The numerous Soviet officers who have been sent to the Chinese front report that all the Chinese troops fight fanatically and only give way before superior force. Besides, the Chinese military mission in Moscow declares that China has no intention of capitulation but that she will continue to defend herself with determination.

SABOTAGE IN SOVIET FACTORIES

The correspondent believes that the foreign press is wrong to underestimate the importance of sabotage which is frequently committed in the Soviet factories; they are in error underestimating the extent of an anti-Bolshevik movement which does not cease to increase in all the population and even among the workers.

In the war industries, sabotage has increased eleven per cent between April 1937 and April 1938; these acts take place usually at night and are so common that guards have had to be reinforced. It is the military factories at Gorki that lead in this domain; but the intensity of sabotage has also spread in the Ukraine where the Separatists work hand in hand with the anti-Bolsheviks.

The serious explosion which took place in the military warehouses of the port of Leningrad is a fact. Even in Moscow during the month of April there were seven definitely determined acts of sabotage. At Lougansk, a military factory, there have been seventeen workers arrested for participating in an act of sabotage.

GENERAL ESTIMATE ON THE INTERNAL SITUATION IN RUSSIA AND ITS CONSEQUENCES

Shortly after the execution of Marshal Toukhatchewski and other high military persons, it was whispered in circles connected with the Kremlin and the diplomatic representatives that the purge in the Army had made a deplorable impression on the French Government and that it had confirmed the directing heads of the French Army in their opinion that the Red Army could no longer be counted on. These rumors were later confirmed by Bolshevik reports from Paris which indicated that confidence in the Red Army has decreased singularly.

It is understood, according to Bolshevik information in Paris, that any government which brings about the fall of the Bolsheviks will not attempt to renew the military alliance with France, but will seek an entente with the Rome-Berlin axis.

This opinion is shared in Russia in the military circles which would like to overthrow the Bolsheviks. They are unanimously agreed that a new anti-Bolshevik Russia would be obliged to seek an entente with Berlin and Rome in view of the fact that France has betrayed the Russian people in sealing an alliance with Bolsheviks.

In the same military circles, they are of the opinion that the French proletariat is so contaminated with Bolshevik virus that a new and nationalist Russia could not depend upon such a sick state. An alliance with Berlin and Rome is thus, after a revolution, the necessity of the hour. To summarize, it appears that in French military circles, confidence in the Red Army is lacking and they believe it possible that a military putsch may take place in the Soviet Union any day. The Red Army apparently can no longer be counted upon, and they fear that some day the forces which overthrow the Bolsheviks will not be friendly with France.

7 and 8 August 1938

EMPLOYMENT OF ENGINEER TROOPS IN SPAIN.
[Emploi des troupes du Genie en Espagne.]

In the Russian military paper "Krasnaia Zvezda," Jarow studies the employment of engineer troops in Spain.

Engineer troops in Republican Spain include organizations of sappers (canudoros) and fortification organizations (ingenieros). The first are included in the effectives of combat troops and construct the works either in the forward line or in the rear of divisions and army corps; they include brigade sapper companies, and some division and corps battalions. As for the fortification troops, they are under control of the army commander for works in the rear on routes of communication, et cetera. Besides these, one finds ponton battalions, miner battalions, and demolition battalions.

Engineer units are not employed in the Republican army as they are in other armies; primarily they are work organizations which are not armed. Only recently have some organizations been armed with rifles. The instruction of sapper organizations has been especially detailed. It prepares them essentially for working at night.

In modern armament, the action of aviation does not permit daylight work in active sectors; consequently, to a depth of from five to eight kilometers behind the front line all the engineer work is done at night. This was the case during a full two months and a half after the Teruel operation. Experience has proved that working at night and without noise requires special habits. First, it is necessary to regulate the question of rest during the day, but in daytime the battlefield and immediate rear are under fire of aviation and artillery. To rest in villages near the position is impossible. Rest in the trenches cannot be envisaged, since the sappers are not armed and have to get out for the slightest alert. Such action would have a bad influence on the morale of the combatants. Therefore the Republican command constructed covered places in suitable localities to protect the night working sappers against aerial attack.

Experience has proved also that it is necessary to give sapper organizations who work at night, guides to conduct them to the place of work. Changes in the situation often oblige them to work in localities unknown to them. It has happened that certain units went up to the position of the adversary and started to work.

Because of the constant night work, sapper organizations quickly become exhausted. With the object of preventing too great weakening of these units, they are relieved frequently like the infantry in the trenches. Therefore it has become necessary to have permanent reserves of engineer troops.

As for the instruction of sappers, it must be carried on in many different lines. They should know the trace of all the works of modern fortification, and should know enough to choose the best place for construction. They need to know how to construct a machine gun nest, a command post, an observation post, as well as various refuges from the most simple to a reinforced concrete dugout. They should know the thicknesses necessary to assure protection with different materials against all calibers of artillery.

The war in Spain has shown how essential it is to maintain routes of communication in good condition. Upon this depends the supply and evacuation of the front. Routes are ceaselessly used by vehicles, and a great deal of work quickly becomes necessary in time of rain and snow. During the Teruel operations, eighteen battalions of sappers were hardly sufficient to maintain the roads. When snow started to fall, the situation quickly became critical. Although the road net in Spain is good in general, and many roads are asphalted, enormous effort has been required to maintain them. Many new routes have had to be constructed by fortification battalions for automobile transport.

There has likewise been a great deal of bridge work. In the Teruel operations, the Republican army had to construct nine bridges from seven to fifteen meters in length. The construction battalions have the especial mission of preparing demolitions on routes of attack, bridges, fills, et cetera. They construct obstacles that temporarily are insurmountable by the assailant. They construct tank obstacles. They also execute destructions to facilitate the passage of their own troops.

The multiplicity of work confided to engineers in modern war requires large numbers of sappers. A proportion of ten to fifteen per cent of all the troops seems a necessity at the present time.

18 August 1938

MILITARY SECRECY IN GERMANY.

[Le secret militaire en Allemagne.] General Niessel

Germany, while proceeding with the rearmament program which disturbs all her neighbors, surrounds these preparations with all mystery possible to hide their nature, and this is a circumstance which justly inspires lively suspicion. The secrecy maintained by the press on interesting points is almost as complete as in wartime, and in the journals only propaganda is printed, either to reassure the population or to menace her neighbors.

There is a great inequality in the conservation of military secrecy between the totalitarian countries and democracies such as ours or Great Britain. In Germany there is no public discussion about military appropriations, and it is out of these budgetary discussions that important information on effectives and matériel is obtained. It is true that although before the Hitler regime a military budget was discussed and published, the figures supplied by this document were manifestly false. To be convinced of this, one needs only to recall that the amounts apparently appropriated for the Reichswehr were a great deal larger than those allocated before 1914 for an army of 800,000 men.

France's budget, on the contrary, is abundantly discussed in public sessions. The laws of organization and the headquarters established indicate exactly the numbers and composition of our army. M. Daladier, Minister

of National Defense, said, in speaking of the last budget, that the French army had but 386,000 men present in Europe. No such information appears anywhere in Germany.

The study of German laws does not unveil the subject of reorganization of the German army except in a very general way, and this is often denied by the facts. The German laws on recruiting are very flexible. The duration of military service is not fixed by it; it is the Chancellor who orders this without reference to anyone. The Minister of War, without reference to anyone, fixes the date and duration of the periods of instruction of Reservists. He has authority to keep them under colors beyond the end of the period, and also to continue in service the class which has completed its instruction. This permits them to guard the secrecy of preparations for mobilization and to bring the active forces of the German army almost on a war footing without warning. Among us, on the contrary, if the Government believes it indispensable to recall the youngest classes of Reservists, it is forced to go to Parliament to obtain approval of the measure. It is impossible to discover how many Reservists are called in Germany; with us the budgetary credits indicate exactly the numbers.

The law on the labor camps says only that all young Germans will spend six months there before being called for military service. But we do not know what is the actual duration of their time in these camps or how many hours a day are spent in military instruction. We know nothing of the numbers of the leaders who direct this work, although these leaders actually are military instructors.

The silence imposed is not limited to the army. It extends also to factories working for national defense. These establishments have a military guard by detachments of Brown or Black Shirts, and the personnel is warned that any indiscretion concerning their work will be punished without pity.

While the punishments applied among us to espionage are limited to some months or, at the most, a few years of imprisonment, in Germany the death penalty is authorized and is even applied to women. We find ourselves, thus in a position of distressing inferiority with reference to conservation of the secrets of our national defense.

Chancellor Hitler has never hidden the fact that he makes his greatest decisions in secrecy and will fall "like lightning" on the enemy that he decides to attack. Invasion of Austria at the time of Anschluss, executed without any warning whatsoever until the last minute, shows us that this menace is not vain boasting.

At any time the practices in use in Germany by virtue of existing laws permit the military chiefs to take all the preparatory measures leading to secret mobilization. This is a command for us to be ready at any moment, in spite of the causes of the inferiority and delay resulting from our legislation. Perhaps this is for France a question of life or death.

28 August 1938

THE RUSSIAN ARMY WITHOUT LEADERS.
[L'armée russe sans chefs.]

This is the title of an article by Dr. A. Loesner recently published in "Deutsche Wehr." The author states that his information was taken from an emigrant magazine in Czechoslovakia (The Sentinel) and the Polish press.

The number of superior officers reached by the inflexible will of Stalin has been much greater than is popularly believed, and makes it probable that the Red army will need a long time to recover from the bloodletting in its higher ranks. Never, even during the most deadly battles against the White Russians, have such severe losses been recorded.

The magazine enumerates the losses known at this time: four representatives of the People's Commissars in the Ministry of National Defense have disappeared; Gamaruk, the Chief of Political Direction, by suicide; Marshal Toukhatchewski; the naval head, Admiral Orlow; and the Chief of Military Aviation, General Alksnis, have been shot for espionage or treachery. The same accusation is now made against one of their successors, Marshal Iegorow, whose fate is not known.

Among the others of the same Commissariat who have been shot are: the Chief of Personnel Bureau, General Feldmann; the Chief of the Bureau of Aerial Defense, Siedakine; the Commander of Mechanized Troops, Volkis; the former Commander of the Signal Troops, Chalepski; the Chief Veterinary Officer, Nikolski; the head of the Department of Railways, Apoga; the Inspector of Artillery, Koulik; the Commandant of the Superior War School, Kork; the head of the Military Academy, Ippo; the head of the Supply Service, Schiffres; the head of the Department of Foreign Affairs in the Commissariat of National Defense, Gekker; and the Inspector of Athletics in the Army.

As for commanders of military regions who have met the same fate, the following are cited: Iakir of Kiev; Ouborevitch of White Russia; Kachirine of North Caucasus; Doubovoie and his representative Gailit of Kharkow; Griasnow and his representative of Trans-Baikal. The seconds in command of the following regions as well: extreme Orient, Moscow, and Leningrad.

Except for the Commander of the North Sea Fleet, all the regional and fleet commanders have disappeared. Many others of all grades have been shot; their numbers must amount to many thousands.

In the three western regions (Moscow, White Russia, Kiev), all the corps commanders have changed. During this last year 40% of the officers have disappeared from the troops. Thus one finds today, colonels acting as division commanders, and many regiments are commanded by captains and even by lieutenants. For example, the present Chief of Aviation of the Leningrad region, Colonel Kopetz, who was a lieutenant on the list of candidates in December, 1937, is now a colonel with an important position.

The magazine adds that Stalin seems to be afraid of his own army; that whatever the cause, grave discontent has seized the remainder of the officers still in service. The consequences of such a state of things are clear. The foreign policies of Russia are entirely dominated by these modifications in the

Officers' Corps, and in spite of all the progress made in equipment and modernization, the Russian army will remain very weak for a long time and not suitable for employment in the field. The author concludes that the Russian army is no longer, for the moment, a factor of importance; that everything attests this, notably events in the Far East and the recent crisis between Poland and Lithuania.

1 September 1938

AERIAL BOMBARDMENTS IN SPAIN.

[Les bombardements aériens en Espagne.] General Niessel

There has been much discussion of Insurgent aerial bombardments of certain localities in Government Spain. These include Granollers, Badalona, Burriana, as well as Barcelona, Valencia and Madrid. The Nationalists have always maintained that these localities contained war industries and constituted legitimate objectives. They consider that the government should have evacuated their population if they wanted to avoid the horrors of civil bombardment.

The Press almost without exception, and especially in England, has commented more or less indignantly upon the losses inflicted on the civil population. However, it should not be forgotten that it was the Loyalists who inaugurated the bombardment of cities. Ceuta was attacked in this fashion during the first days of the war before the end of July, 1936. During the same period the coastal cities of southern Spain were heavily bombed by the Government navy, which then controlled the sea.

The statistics of Government bombardment in Insurgent Spain were released by the Spanish Information Bulletin of General Franco last August 16th. They show 373 cities and villages bombed, 2,091 raids, 18,985 civilians killed or injured.

Some genuine military objectives are included in these losses, but many small interior towns were bombed also. Certainly it is deplorable that the population residing far from the theater of the struggle should have to submit to pointless losses by aerial bombardment. But it is unjust to blame just one side for this type of loss. It is very true that the Loyalists have exaggerated theirs by propaganda in the hope of gaining foreign sympathy.

One of the remarkable things about these figures is that after two years and more than 2,000 bombardments only 18,985 were killed or wounded. The lesson to be learned is that aerial danger, however great it may seem, can be endured. But this is also a reason to do everything possible to meet it.

ANTITANK DEFENSE IN THE SPANISH WAR.

[Les enseignements de la guerre espagnole. La défense antichars.]

The following information concerning antitank defense in the Spanish War is extracted from an article by Gousiew in the Russian magazine, "Red Star." The means of antitank defense are active and passive. The more important passive means have been judicious use of the ground. Most of the mountain chains or heights lend themselves to preparations which amply block tank attack. Centers of resistance installed on the slopes have been very effective.

Practice has demonstrated that woods are excellent obstacles against tanks. Every piece of woods should be used as an antitank position. Railway cuts and fills, ravines with steep slopes, water courses with a depth of more than a meter, and rivers with banks with a 20 degree slope, have shown themselves insurmountable obstacles to tanks. The speed of tanks has been reduced remarkably by artificial antitank defenses.

Stone barricades, the height of a man, have been shown to be insurmountable by tanks. Narrow streets make excellent tank traps. Tank mines have given excellent results. They have been employed in all serious operations, especially in July, 1937, at Grunete. Hand grenades and bundles of grenades have also been much used. Ground which is difficult to traverse slows the tanks down to 3 to 5 miles an hour and this permits a successful grenade attack.

But antitank artillery is one of the best active means. This artillery is included in the composition of the Republican brigades, as well as the small caliber antitank cannon.

With the idea of repelling enemy attack, antitank artillery should:

- Prevent the enemy, during the artillery preparation, from destroying the antitank cannon of the defensive;
- Prevent the adverse tanks from crossing the advanced line of defense;
- Separate the infantry of the assailant from their tanks.

During battle Republican antitank artillery concentrates its fire on the tank assemblies and directs its fire in front of the advanced position. Independently of the struggle against tanks the infantry requires the antitank artillery to neutralize or silence the hostile fire. In the operations at Brunete each infantry brigade had a battery of antitank guns of 45-mm caliber. This battery accompanied the infantry. The batteries which accompany the infantry destroy machine-gun emplacements and combat antitank cannon.

For defense against tanks Republicans also used division and corps artillery. In the defensive the antitank artillery establishes itself in well covered positions. As long as they are not discovered they are very effective against tanks. Often they are installed in houses on the outskirts of inhabited places or behind stone walls.

Experience has proven that even with two or three antitank cannon for each kilometer of front the tanks of the attacker have heavy losses. Defense of centers of resistance is assured by four or five cannon per kilometer of front.

The depth of antitank defense has not been great. It is limited to the occupation of positions between the first and second line of infantry trenches. Antitank cannon are forced to change their positions frequently. Experience has proven that antitank cannon can fire accurately at distances up to from

700 to 1,000 meters. The difficulty of fighting against antitank cannon comes essentially from the fact that this cannon is a small, almost invisible target, and especially so to the tank.

16 September 1938

COMMAND AND COMMISSARS IN THE RED ARMY.

[Le commandement et les commissaires dans l'armée rouge.]

According to information received from Poland by the Russian "Renaissance," the results of the inquiry conducted by a Special Commission in the Far East have been extremely unfavorable for the political direction of the army. It is recognized that the position taken by the political guides had injured the combatant ability of many organizations. In particular, the instructions of Mekhlis (Chief Military Commissar) himself were often in contradiction with the missions of the Red army.

This provoked a bitter conflict between Vorochilov and Mekhlis. The former protested vigorously against enlarging the rights of political commissars, especially in the artillery, tanks, and aviation where the ignorance of Mekhlis' subordinates has caused and continues to cause tremendous harm.

In the meeting of the Central Executive Committee where the conclusions of the Commission of Inquiry were announced there was a dramatic discussion between the invincible Marshal and his Chief Political Commissar, the all-powerful Mekhlis. Without limiting their expressions they accused each other of a whole series of neglects, faults, and usurpation of power. According to rumors, Blücher took the part of Vorochilov and told Mekhlis the following: "There has been enough of this. We will no longer endure your spies in the units confided to us." Stalin was obliged to intervene in the dispute. He sided with Vorochilov and Blücher and promised that Mekhlis temporarily would be returned to second place.

The "Red Star" published an article dealing with the abnormal position in which the political commissars find themselves in aviation units. Aviation troops contain many men with good technical education. As for commissars named by the political party of the army, as a general rule, they are barely able to read and write, ignorant on technical questions, do not know airplanes, but still attempt to guide politically and culturally the youth, which is much superior to them in education and development. In this article one is given to understand between the lines that the agents of Mekhlis are a useless ballast.

Some days after the same magazine published, obviously in response to the accusations of Vorochilov, an article inspired by Mekhlis in which was cited a series of facts indicating the general failure of discipline in the Red Army. This article was directed against those Red commanders who had become Liberals, and by their conduct have shown some indulgence against the violators of discipline.

The struggle between the political direction of the army and its commanders is increasing daily. Mekhlis obviously is passing to the offensive against Vorochilov and his partisans. "Red Star" for several days systematically occupied itself with praise of the Political Commissars. It narrates in a series of articles the valor shown by the political guides during the combats in the Far East; it indicates with emotion how they replaced the commanders; how they know the proper treatment for simple soldiers. In a word, the agents of Mekhlis "put their best foot forward."

The Special Commission charged to inquire into the abuses discovered in the Army of the Far East established the guilt of some Red commanders. The guilt of the Chief of the Supply Service of the Army of the Far East, his executive and four other Red officers was determined. The Fournier Agency reports the discovery of a theft of 120,000 rubles and the disappearance of many carloads of food.

INFANTRY JOURNAL

November-December 1938

DEADLOCK IN SPAIN. Captain Johnson
THE LONG ROAD TO HANKOW. Lieutenant Rudolph
TWO DIVISIONS. Lieut.Colonel Dorst and Ingram Cary

January-February 1939

BONAPARTE IN ITALY. Pratt
PALESTINE: SOME ASPECTS OF THE MILITARY PROBLEM. Major Yale
LEADER AND LED. Major Phillips
BLACKOUT. Lieutenant Weber
OPPOSITE THE MAGINOT LINE. (Pictures)

JOURNAL OF THE ROYAL ARMY MEDICAL CORPS

(Great Britain)

November 1938

THE PURIFICATION OF WATER SUPPLIES BY UNITS IN THE FIELD. Lieut. Colonel Mackenzie
THE REGIMENTAL MEDICAL OFFICER AT ANNUAL TRAINING. Major Cohen

January 1939

THE TRAINING OF A TERRITORIAL FIELD AMBULANCE IN CAMP. Lieut. Colonel Lethem
TWO IMPROVISED OPERATING TENTS. Major Harris

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January 1939

THE WATERLOO CAMPAIGN. Lieut.Colonel Head

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November 1938

THE CHEMIST'S ROLE IN NATIONAL DEFENCE. Lieut. Colonel Shekerjian, U.S. Army
TANKS IN THE ATTACK: FRENCH AND GERMAN TACTICAL THEORIES
THE MILITARY ENGINEER IN MODERN WARFARE. Major-General Bond

JOURNAL OF THE UNITED SERVICE INSTITUTION OF INDIA

(Great Britain — India)

October 1938

THE SINO-JAPANESE STRUGGLE. Major Nicolls
"DISCUSS THE DICTUM THAT THE SIZE OF MODERN ARMIES HAS RENDERED STRATEGY WHOLLY SUBORDINATE TO TACTICS." Major Milne (Gold Medal Prize Essay, 1938)

THE NEW INFANTRY TRAINING, 1937. Lieut. Colonel Dods
THE MEDITERRANEAN TO-DAY. H. Jay

DIE KRAFTFAHRKAMPFTRUPPE (Germany)

By CAPTAIN H.N. HARTNESS, Infantry

July and August 1938

FRENCH PRINCIPLES FOR THE EMPLOYMENT OF MECHANIZED AND
MOTORIZED UNITS AND THE DEFENSE AGAINST THESE.

[Französische Grundsätze über Verwendung mechanisierter und
motorisierter Einheiten und der Abwehr dagegen.]

(See digest, page 68)

September 1938

TANK QUESTIONS.

[Panzerfragen.] Major General v. Radlmaier

Major General Ritter von Radlmaier lays emphasis on the necessity of carefully studying the technical capabilities of tanks as such capabilities affect the employment of tank units. Further, he stresses the importance of a thoroughly trained officer and enlisted personnel, one thoroughly familiar with both the tactical and technical capabilities and limitations of the arm. Such knowledge demands a comparatively long period of service and special training other than that obtained in service with tank units.

In all great states today the opinion is held that tanks are indispensable in battles of decision. Furthermore, it is stated that the choice of terrain for the decisive combat will be based on the possibility of employing tanks.

In preparation for the decision tanks or mechanized units, such as light mechanized divisions, will have a decisive influence, both in the strategical reconnaissance and for the security of the main forces in terrain favorable to tank employment. In exploiting a success on the battlefield, tank and mechanized units assist in completing the breakthrough and, in the pursuit, assure the full fruits of victory.

Whether emphasis is placed on organization of the so-called mechanized unit or on the tank unit is less a question of technical accomplishment and more a matter of opinion as to employment and of national defense policy.

If a nation limits itself in the main to the organization and equipment of tank units with modern means, these should be employed in conjunction with the traditional large units, divisions, corps and armies. Because of greater speeds and reliability and increased tactical and strategical mobility, greater results can be expected than in the World War. And of course, there is no reason why a nation which limits itself initially to the formation of tank units only can not gradually develop large mechanized units, using the tank units as bases.

If emphasis is laid on the large mechanized unit, there is no question but that a fundamental change in the organization of the army must be the result. The main arm of these units is the tank. The organization and battle technique must conform to the requirements of the tank, whereas previously the infantry was the basis for organization and technique. As we consider the situation today, we must come to the conclusion that we are facing a turning point.

Up till the present practically all nations have organized mechanized units by changing over horse cavalry to mechanized units. The limit of such transformation has about been reached. The creation of additional mechanized units must be done at the expense of other arms. But it is questionable whether in the near future such a decision will be made. Conceptions of organization, the kind and strength of the various components, the kind of matériel required for various tasks, the training, the employment and leadership of these mechanized units do not seem to be sufficiently crystallized to warrant a jump so great.

It must be expected that for some time to come modern armies will concentrate on the organization of tank units to be employed with the larger commands and for the present will limit the number of large mechanized commands.

TANKS — ARMORED RECONNAISSANCE CARS AND THE DEFENSE
AGAINST THESE.

[Panzerkampfwagen — Panzerspähwagen und die Abwehr dagegen.]

A glance at the latest developments in foreign armies and their views about employment of and defense against armored units.

Polish views concerning the employment of large armored units.—From "Bellona" is taken the following:

The march length of an armored division (consisting of a tank brigade, a motorized infantry brigade, a motorized artillery regiment and division troops) with a distance between vehicles of 50 yards, is 62 miles.

The rate of march is 6 to 13 miles per hour by day; 3 to 4 miles per hour by night.

A day's march is 47 to 63 miles.

The camouflaging of such a column is difficult, yet an armored division on the march offers a poor target for an attack from the air. During halts and rests the division must seek concealment.

Combat by the armored division is possible only during daylight hours.

The zone of attack of a battalion (tanks or infantry) is 1,000 to 1,500 yards. The division, attacking in depth, occupies a zone of 3,000 to 4,000 yards.

The supply column of 160 ton capacity occupies a road space of 9 miles on the march.

Czechish views on the employment of tanks. — "The Tank in Modern War" is the title of an article in the Czechish "Officers' Times."

The author warns against the danger of drawing too positive conclusions from tank operations in Spain. Especially does he warn against that conception that the infantryman, with a stout heart and a bottle of gasoline, can conquer the tank.

Especially stressed is the need for careful and thorough training in both operation of the tank and firing of the weapons. He holds that a three to five year training period is necessary.

Experiences in Spain have demonstrated that tank attacks must be supported by artillery. A well organized defense may force the attacker to employ initially infantry and artillery only to overcome the hostile position, then in the pursuit or in the exploitation of the initial success to employ his tank units. From the Spanish War he draws the conclusion that tanks in the limited numbers employed in Spain can have only local tactical influence.

The following points must be considered when tanks are employed in a future war and success from their employment is expected:

(1) Mass employment — at least 100 tanks on a 1,000 yard front and these supported by the necessary accompanying weapons and artillery;

(2) Careful organization of replacements, so that losses can be quickly replaced;

(3) Further development of 20 to 30 ton tanks, armed with 6.7 to 10 centimeter guns and 5 to 6 men crews.

With such matériel and adequate accompanying artillery a commander may expect to reach a decision in war. In the future not hundreds, but thousands of tanks and airplanes will be employed on a narrow front where the decision is sought.

Czechish views on antitank defense.—Antitank defense is discussed in the Czechish "Officers' Times." Two viewpoints are considered. One demands the mass of antitank guns be with companies, battalions and regiments, with but a small number with the higher echelons (division and corps). The other insists that all antitank guns be concentrated in the regiment, the division and the corps, in order that they can be more readily employed in the threatened area.

Means of active antitank defense are heavy machine guns (13-mm to 20-mm), tank rifles of similar calibers, 37-mm antitank guns and artillery.

Suitable for allotment to the lower infantry units are the heavy tank rifle and machine guns (the author believes each company and each battalion should have four). Calculations by the author give the following results: By opening fire at its maximum effective range (1,000 to 600 meters) the antitank gun (37-mm) will have about four minutes in which to fire upon the approaching tanks. In four minutes 28 well aimed shots can be fired. But under hostile fire this number will be reduced by about 50% and of these 50% can be expected to be hits; that is, each gun can register 7 hits. Therefore, 7 tanks can be disposed of. From this calculation it follows, when one assumes that not more than 30 tanks will attack in a battalion sector, that a minimum of four antitank guns per battalion, that is, 12 per regiment are necessary.

In addition to the active means employed, all other means must be utilized to stop or block the tanks. Every defensive position must be selected with the maximum consideration given to terrain secure against tank attack. Artificial obstacles of all sorts must be prepared.

KRASNAYA ZVEZDA (Russia)

(Central Organ of the Commissariat of Defense of the U.S.S.R.)

BY LIEUTENANT JOSEPH DASHER, Military Intelligence-Reserve

18 August 1938

THE PURSUIT PLANE AT HIGH ALTITUDES.

[Istryebityel na Bolshich Vysotach.] Colonel I. Lakeyev

To conquer altitude is the basic and decisive problem of modern pursuit aviation. It is at high altitudes, in substratosphere, that the outcome of aerial combat will be decided. Experience of the Spanish Civil War teaches, that more than once Loyalist pursuit ships were able to successfully combat the Insurgent air forces by rising to altitudes unattainable to Insurgent pilots. Soviet aviation strives to conquer substratospheric altitudes, and ascent to 10,000 yards has now become a not unusual occurrence in the air force of the U.S.S.R. Although such altitudes test not only the physical endurance of the flyer, but the mechanical perfection of the machines as well, the author points out that Soviet fliers and their ships have shown that they are equal to the difficulties encountered at great heights.

21 August 1938

AVIATION ON THE BATTLEFIELD. [Aviatsia na Polye Boya.] Colonel Osipenko

The author points out the necessity for proper utilization of air force in combat. Air raids, when executed by smaller number of planes, but without interruption every 10 to 15 minutes, exhaust enemy troops, forcing them to stop offensive operations, seeking shelter in trenches and dugouts. The war in Spain proves, that if the air force is small, it is necessary to use it first of all on the battlefield, and next in attacking the enemy's rear and his reserves. Aviation should concentrate on one, the most important objective, forcing the enemy to reorganize against his will. In defending itself against antiaircraft fire, aviation should execute lightning strafing attacks upon enemy positions, using both light ships and bombers, whenever possible. Long range artillery — as shown in Spain — quickly silences antiaircraft batteries.

26 August 1938

TANKS AGAINST TANKS. [Tanki protiv Tankov.] P. Kolomeytshev

Observing on certain phases of recent field exercises of the units of Moscow military district, the author raises the question as to method of procedure for tanks when on dusty terrain. Contrary to an artificial smoke screen, the continuity of action in dust cannot be established in advance. Dust follows tanks, interfering with visibility, creating the danger of collision with other tanks, preventing the driver from seeing obstacles, and jeopardizing inter-communication between tanks. It is thus clear that on dusty terrain deep tank formations should be avoided. In a battle of tanks against tanks, the victor will be determined by the speed with which fire will be opened with all weapons. In anticipation of an engagement with tanks, close formations should be used. It is best to fire at tanks from a concealed position, affording the enemy the visibility only of the tank's tower. In open terrain stops should be made for not less than two rounds of fire. Stops of 4 to 5 seconds duration are impractical, because they do not afford the opportunity for proper correction of fire. Better results are obtained by concentrated fire of several tanks upon one objective. Tanks bearing commanders, or leading the advance, should be the first to be destroyed. In a battle of tanks maneuvering should be subordinated to fire action.

24 September 1938

NEW INSTRUCTIONS FOR HAND-TO-HAND FIGHTING. [Novoye Nastavlenye po Rukopashnomu Boyu.] A. Tarasov

The author discusses various features of the new Red army instructions for hand-to-hand fighting, quoting the wars in China and Spain, as well as the Soviet-Japanese collision at Lake Khasan (Changkufeng), as examples that this form of combat still has to be reckoned with.

30 September 1938

NIGHT ACTION OF ARTILLERY. [Nochniye Dyestvia Artilerii.] Colonel N. Lyevin

Utilization of artillery at night presupposes daytime preparation — such is the general rule. However, sight should not be lost of the fact that in many cases it is possible to move up separate artillery units toward the enemy, in semi or total darkness. In such situations, to await dawn before beginning preparations for combat is to give the enemy the whole night for his own disposal. Artillerymen should be able to make reconnaissance at night, to select firing positions and observation posts, to occupy them, to provide for communication between them, to establish co-action with infantry, to prepare all data for firing, and to conduct artillery preparation for an infantry attack.

The author also discusses various methods of target illumination, and means for overcoming certain mechanical difficulties in night firing.

2 October 1938

INFANTRY IN NIGHT OFFENSE. [Pekhota v Nochnom Nastupatel'nom Boyu.] A. Khimin

In all preparations for offensive operations, the command of the Spanish Loyalist army always utilizes darkness. In this manner the counteroffensives in the sector Majadaonda-Las Rosas, in January 1937, as well as the offensive operations at Brunete, Zaragoza, Teruel, and on the Ebro River, were prepared. Well concealed preparations and sudden start of action permitted the Loyalists to penetrate deep into enemy's fortified positions. In 24 hours, at Madrid, the Loyalists advanced 9 miles, on the Aragon front 16 miles, and at Teruel 6 to 8 miles. Offensive actions which were begun in the daytime did not produce such deep penetrations. Infantry plays the principal part in night combat, and should be especially trained for it. As a rule, infantry advances at night without firing. Because of this the soldier must excel in the use of the bayonet and hand grenade. Night orientation, the maintenance of direction, communication both vocal and visual, and night reconnaissance, can be mastered only through special training.

4 October 1938

THE HAND GRENADE IN COMBAT. [Ruchnaya Granata v Boyu.] I. Pernov

"Pocket artillery" — the hand grenade — is a powerful weapon in the hands of a well trained fighter, not only because of the physical, but also because of the moral effect it produces. In the Spanish war the use of hand grenades is widespread. Experience in that country shows that the average throwing distance for a hand grenade is from 40 to 60 yards. The hand

grenade plays an important part in antitank defense, especially where antitank guns are lacking. At Torrevalle the Loyalists repulsed two attacks in one day using hand grenades only, although the Insurgent forces were supported by 47 Italian baby tanks.

20 October 1938

THE COMMAND POST OF A COMMANDER OF A FORCE OF ALL ARMS. [Kommandnyi Punkt Obshevoyskovovo Nachalnika.] V. Sudakov

Such questions as selection of terrain for the CP, concealment, camouflage, personnel, supply, message center, etc., are discussed on the basis of the author's observations in the Spanish Civil War.

21 October 1938

PRINCIPLES OF PRESENT DAY OFFENSIVE COMBAT. [Osnovy Sovremennovo Nastupatel'no Boya.] P. Petrosov

The organization and conduct of offensive combat in present day conditions are military problems of great importance. Dividing the problem of offensive combat into several parts, the author discusses each one separately.

WIDTH OF THE BREAKTHROUGH

This cannot be standardized, as such width is determined in each case by offensive means at disposal, strength of resistance, terrain conditions, etc. Well organized breakthrough — from 16 to 19 miles wide — seems to promise the maximum success, providing that sufficient forces and means are available not only for the breakthrough itself, but for carrying it further, deep into enemy lines.

COMBAT FORMATIONS

The attacker's combat formation should be deep. Frequently it is necessary to form the shock group of a division or corps, into two echelons. According to Kuznetsov, the combat formation of a division should be in one echelon, if the attacking enemy is suddenly forced to take the defensive. However, if the enemy had prepared himself for determined defense, then the combat formation of a division should be in two echelons.

NORMS FOR ARTILLERY SUPPORT

Basing his opinions on the experiences of the Spanish war Kuznetsov maintains that it is insufficient to have 30 to 35 guns to 1 kilometer of front, as provided for in Soviet Field Regulations. It will not be excessive to have up to 60 guns to 1 kilometer of front, in the direction of the main blow.

LENGTH OF ARTILLERY PREPARATION

Experience in Spain shows that artillery preparations of less than two hours' duration, when advancing upon enemy's reinforced positions, do not produce the required effect. Length of artillery preparation will be determined by the nature of the defense, number of guns, and time necessary for the destruction of targets. If targets are strong, but not of concrete construction, artillery preparation of 2.5 to 3 hours has been found to be sufficient. However, for concrete targets 6 to 8 hours will be required.

THE USE OF TANKS

Golubev calculates that infantry acting in principal directions should be supported to the extent of one tank company to each battalion of the first and second echelons, if the battalion is advancing along a front of not more than 1 kilometer. It is desired that infantry breaking through in the direction of the main blow, should have the support of tanks throughout the tactical depth of the enemy's defense, and wherever the terrain allows the use of tanks.

THE ROLE OF AVIATION ON THE BATTLEFIELD

During the battle at Lake Khasan (Changkufeng), Soviet aviation was highly effective, aiding land troops in the capture of reinforced Japanese positions. Both Spain and China show that aviation supplements and strengthens the means of land combat on decisive sectors of the front.

THE NATURE AND METHODS OF THE BREAKTHROUGH

The author agrees with Kuznetsov that the enemy should be attacked along a wide front, but the task of destruction should be by separate parts. The attack along the depth of the basic defensive sector should be executed by aviation, tanks and artillery. This is followed by the advance of infantry, which, preceded by an artillery barrage, strikes to destroy the enemy by separate parts. First, enemy troops in the basic defensive sector are destroyed, then on the reserve positions, and even in the rear. The problem of a shock group amounts to this: by utilizing in its own advance movement means of locomotion and a part of its infantry for flank attacks, and sometimes striking the enemy's rear, and jointly with the "forging" division, to surround and destroy enemy troops facing that division.

22 October 1938

FIELD AIRDROMES. [Poleviye Aerodromy.] G. Ivanov

The author expresses his views on methods of building landing fields in proximity to combat lines. Such questions as the building of the CP shelter, shelters for planes, quarters for personnel, selection and equipping of shelter for ammunition and fuel supplies, camouflaging, location of repair shops, equipping of approaches both on land and from the air, illumination of the field, antiaircraft defense, and observation and alarm systems are discussed.

23 October 1938

THE ADVANCE OF THE BATTALION.
[Nastuplenye Batalyona.] A. Sviridov

Methods of advance as employed in the Spanish war by infantry battalion of the Loyalist army, are reported on by the author from first hand observation.

MARINE CORPS GAZETTE

November 1938

SOME QUALIFICATIONS FOR LEADERSHIP AND COMMAND. Brig.General Upshur

Antiaircraft protection for our naval bases. First Lieutenant Nelson
NORTH CHINA. 1937. Captain Griffith
THE ARMY INDUSTRIAL COLLEGE. Major Hatfield

MILITARWISSENSCHAFTLICHE MITTEILUNGEN (Austria)

BY MAJOR E.M. BENITEZ, Coast Artillery Corps

July 1938

ANTI-AIRCRAFT DEFENSE IN THE ZONE OF THE INTERIOR.
[Fliegerabwehr im Hinterland.] Major General Rieder

By the end of the World War bombers had reached a maximum speed of 75 miles per hour and a radius of action of about 125 miles with a load of bombs of from 800 to 1,100 pounds. Today, heavy bombardment aviation has a speed of 250 miles per hour and can invade an enemy country within a radius of 900 miles with a bomb load of about 6,500 pounds. A glance at the map of Europe shows that it is possible for bombardment aviation to reach any point of a neighboring country within a few hours of continuous flight. The possibilities of air attack, therefore, require the organization of the whole country for antiaircraft defense.

Foremost among the means of antiaircraft defense is pursuit aviation, bearing in mind that the offensive is the best defense. However, the enemy may also have pursuit aviation protecting bombardment and in addition it requires a certain length of time for friendly pursuit to take off and reach a suitable altitude for attack. Antiaircraft artillery furnishes a means of defense without any assistance from the air forces. There are three types of antiaircraft weapons:

- (1) Machine guns, caliber from 8-mm to 13-mm
- (2) Small caliber guns, caliber from 20-mm to 40-mm
- (3) Heavy caliber guns, caliber from 75-mm to 120-mm.

The following table shows the altitude and horizontal ranges of some types of antiaircraft matériel:

Weapon	Caliber (MM)	Muzzle Velocity (Feet per Second)	Horizontal Range (Yards)	Altitude (Feet)
Machine Gun.....	8.-	2,350	4,400	7,500
Machine Gun, Vickers.....	12.7	3,100	7,000	13,000
Machine Gun, Oerlikon.....	20.-	2,720	5,500	12,100
Machine Gun, Bofors.....	40.-	2,950	9,300	18,600
Gun, M-32, Norwegian.....	75.-	2,460	16,500	31,100
Gun, Skoda.....	83.5	2,620	21,400	43,000
Gun, Bofors.....	105.-	2,460	17,100	36,000

A study of trajectories and ranges shows that machine guns of from 8-mm to 13-mm caliber are effective to an altitude of 3,300 feet; 20-mm to 40-mm guns to an altitude of 9,800 feet, and large bore guns to an altitude of 13,100 feet.

The distance between antiaircraft guns and the objective depends upon the terrain and the accuracy of the weapon. The farther away that a battery is from the protected objective the sooner its guns will be able to open fire against the hostile plane; on the other hand, batteries must not be placed too far from the objective because their fire may become ineffective within its defensive sector. A distance of from 5,500 to 6,500 yards from the objective, depending upon the terrain, is considered satisfactory.

POLITICAL AND MILITARY REVIEW DURING THE SECOND QUARTER OF 1938.

[Wehrpolitische Übersicht über das zweite Vierteljahr 1938.] Major General Paschek

The main events may be classified as follows:

- (1) Success of British policies; British-Italian agreement
- (2) Strengthening of Berlin-Rome axis and tension between France and Italy as a result of the Spanish Civil War.
- (3) The Czechoslovakian crisis.

THE SPANISH CIVIL WAR.

[Der Bürgerkrieg in Spanien.] (I) Major General von Lerch

The operations carried out in this war between 15 December 1937 and 30 May 1938 are described under the following headings:

- (1) Operations around the city of Teruel, 15 December 1937-23 January 1938.
- (2) The Sierra Palomera operations, 5-15 February 1938.
- (3) Recapture of Teruel by the Insurgents, 18-22 February 1938.
- (4) The Aragon Campaign, 9 March-30 May 1938:
 - (a) The Drive to the Sea
 - (b) The Ebro Campaign
 - (c) Retreat of the 43d Division across the Pyrenees into France.

August 1938

THE OCCUPATION OF BOSNIA AND HERZEGOVINA IN 1878.

[Vor sechzig Jahren. Eine Erinnerung an den Okkupationsfeldzug in Bosnien und in der Herzegowina im Jahre 1878.] Major General Kerchnaw

The Austrian army entrusted with the occupation of Bosnia and Herzegovina in 1878 consisted of 11 divisions — 150,000 men. Four columns under General Philippovic operated from the line of the Save in a southeasterly direction through Bosnia, concentrating on Sarajevo, while a fifth column under General Jovanovic advanced from the Adriatic on Mostar. The campaign lasting two months resulted in the annexation of the two provinces to Austria.

THE BOMBARDMENT OF THE RAILWAY VIADUCT AT SABLICI (ITALIAN FRONT, EAST OF MONFALCONE) 9 JANUARY 1916.

[Die Beschiesung des Eisenbahn-Viaduktes bei Sablci östl. Monfalcone am 9. Jänner 1916.]

This viaduct was guarded by the Austrian Landsturm Battalion III/I, which behaved bravely under the heavy Italian bombardment.

NATIONAL BOUNDARIES.

[Staatengrenzen.] Colonel Hubka

Of all the various kinds of boundaries between states, rivers are perhaps the least satisfactory due to the shifting of beds. The World War shows that only boundaries that are economically satisfactory can have any degree of permanency.

THE SINO-JAPANESE WAR.

[Der Konflikt in Ostasien.] Major General von Lerch

The operations of this war to include 20 July 1938 are described under the following headings:

- (1) Operations in Shantung Province, where early in April the Chinese won the battle of Taiierchwang. The Japanese launched a counteroffensive on 19 April capturing Suchow and inflicting heavy losses on the Chinese forces.
- (2) Japanese advance against the Peking-Hankow railway.
- (3) Guerrilla warfare.
- (4) Japanese naval operations.

The Chinese losses during the first year of the war are reported to be 1,000,000; the Japanese 300,000. The losses of the Chinese civilian population cannot be estimated with any degree of accuracy. The author reports that the Chinese have lost 1070 planes as against 89 for the Japanese. It is believed that these estimates are not accurate.

September 1938

RIVER CROSSINGS AT BELGRADE FROM NORTH TO SOUTH DURING THE PAST 250 YEARS.

[Die Stromübergänge bei Belgrad von Nord nach Süd in den letzten 250 Jahren.] Colonel Kiszling

On 6 September 1688, Max Emanuel, Elector of Bavaria, crossed the Save and captured Belgrade from the Turks. The city, however, was recaptured by the Turks shortly afterwards. In 1693, the Duke of Croy attempted to retake Belgrade, but failed.

In 1717, Prince Eugene crossed the Danube east of Belgrade, and recaptured the fortress from the Turks. However, in 1793, after the Prince's death, the Turks defeated the Austrians and Belgrade again became a Turkish frontier fortress.

In 1789, Field Marshal Laudon crossed the Danube northwest of Belgrade and the Save southwest of it, laid siege to the fortress and forced the Turkish garrison to surrender; but the peace of Sistova in 1791, gave back the fortress to the Turks in whose hands it remained until 1861, when as a result of the war between Serbia and Turkey, Belgrade became the capital of Serbia.

In 1914, Belgrade surrendered to the Austrians, but was recaptured by the Serbs. It was again captured by the Austro-German army under von Mackensen in 1915.

The article is fully illustrated with sketches.

TECHNICAL SERVICES IN WAR.

[Kritische Betrachtungen über die technischen Leistungen im Kriege.] Major General v.Aarenau

During the World War nearly three-quarters of a million men were employed on engineer work on the Austro-Hungarian fronts, of which about 200,000 worked on fortifications and bridgeheads. In that war, it was possible to make up shortage of technical troops as time went on, but time will play a more important part in the future than in the past.

It is estimated that, even with the prevalent high standard of education, it will require about three years to turn out a trained sapper. It seems probable that there will be less demand for trained engineers in a future war; however, specialists such as mechanics, electricians and miners will be in a greater demand than ever.

WIRELESS EXTENSION OF THE TELEPHONE SYSTEM.

[Drahtlose Verlängerung des Telefonnetzes.] Dr. Stäger

The author refers to a French invention called the "télémobile," consisting of two parts: a fixed part connected to a telephone system and a portable part which can be carried in an automobile or airplane. Ultra short waves are used. The driver or pilot can use the instrument and communicate like an ordinary telephone.

SUPPLY OF THE AUSTRO-HUNGARIAN BALKAN FORCES DURING THE AUTUMN OFFENSIVE OF 1914, IN SERBIA.

[Die Verpflegung der öst-ung. Balkanstreitkräfte während der Herbst-offensiven 1914 in Serbien.] Colonel Schönauer

Great difficulties were experienced in supplying the Austro-Hungarian Fifth and Sixth Armies with food and war matériels during autumn, 1914. The armies were operating on a 72-mile front, over a mountainous country where roads and railroads were very scarce. The inclement weather increased the difficulties and the troops suffered from typhus and dysentery.

THE SPANISH CIVIL WAR.

[Der Bürgerkrieg in Spanien.] (II) Major General v. Lerch

An account of the Insurgent offensive against Sagunto and General Queipo de Llano's offensive on the Estremadura front. The Loyalist offensive on the Ebro paralyzed the Insurgent advance against Sagunto.

MILITAR-WOCHENBLATT (Germany)

BY MAJOR G.J. BRAUN, Infantry

20 May 1938

IMPRESSIONS AS TO THE FUNCTIONS OF AN AIR FORCE DURING THE PURSUIT OF RETREATING GROUND TROOPS.

[Gedanken über die Tätigkeit der Fliegertruppe bei der Verfolgung einer im Rückzug befindlichen Erdtruppe.] Captain and Flight Commander Stentzler

It is not the amount of enemy material captured that measures the extent of a victory but the intensity and aggressiveness of the pursuit of the defeated enemy. The reconnaissance plane constitutes the best means of determining the exact intentions of an enemy on the defensive as when he starts his withdrawal. It is through this means that the early withdrawal of rear elements in their effort to clear the roads for the night withdrawal of front line elements is discovered. Great care must be exercised in comparing these movements with the normal traffic to prevent falling for a ruse.

The author describes the numerous indications preceding a withdrawal that are observed by the air observer such as numerous wagon and truck columns moving toward the rear, the evacuation of artillery positions especially by the heavy artillery, collection of empty material toward rail lines, concentration of empty truck units just outside our artillery range, concentration of bridging material along streams in rear of the hostile position, construction of barriers along routes of probable withdrawal, etc. Should the enemy be suddenly overwhelmed by our attack and compelled to hastily withdraw we usually find ourselves unprepared to promptly follow up this success due to the inability to forward the necessary auxiliary artillery and munitions required by the artillery as in the act of displacement forward and unable to adequately support the infantry. Here we have a crisis which may provide the opportunity for reorganization of the enemy forces or possibly an enemy counterattack.

This is the psychological moment to employ the combat and pursuit aviation which at this period would receive the minimum antiaircraft interference as the antiaircraft batteries will also be hurriedly withdrawing. Continuous attacks on these withdrawing columns would be the solution.

The reconnaissance planes would locate lucrative targets and relay the information by radio. In this manner they can also inform our rapidly forming ground pursuit of the enemy situation, direction of withdrawal and objective to which they are withdrawing. The continuous air harassment will not only weaken the enemy by losses of men and material but lower his will to resist and increase the confusion of his disorganization and change the withdrawal to a rout.

If the ground forces should have the choice of three methods of pursuit, that of simply following up, direct pressure by continuous renewed attacks by a parallel march with intention of cutting off the hostile retreat naturally having the air assistance they should select the latter method.

Jamming of highways at some bottleneck ahead can be observed by the numerous halts by the retreating foe other than his periodic rests, crowding at crossroads and bridges, abandoning of guns, vehicles, trucks, etc., by the roadsides and often the burning of towns and bridges after the troops have cleared them. These bottleneck locations should be the targets of combat and pursuit aviation.

Most every retreat and pursuit terminates in a race to reach some dominating terrain, stream obstacle, etc., ahead of the other. During this race our combat and pursuit aviation must delay the enemy to gain the

necessary time for our land forces to reach the vital terrain ahead of the enemy.

Usually night slows down or stops ground pursuit but the air force continues its harassment. Interference with anticipated rest by the enemy will lower his morale and all hostile night movements toward rail-loading centers, road nets must be delayed or stopped.

The reconnaissance flights must reconnoiter far behind the hostile lines and flanks to discover and report any threats of counterattacks especially by hostile motorized or mechanized units.

Close cooperation of the air force with the ground force can change a withdrawal or retreat to a panicky rout.

ARTILLERY IN A MEETING ENGAGEMENT.

[Artillerie im Begegnungskampf.] Lieut. General Marx

An interesting retrospect of the Haeseler type of maneuvers at Bisten Lorraine prior to the World War.

THE DEVELOPMENT OF THE AUSTRIAN ARMY UP TO MARCH 1938.

[Die Entwicklung des österreichischen Bundesheeres bis zum März 1938.] Major General v. Wittas

On 1 April 1938 the Austrian army was absorbed by the German army. The author describes the organization of the Austrian army, its reserves, weapons and training prior to that date. He relates how after the World War all officers with less than ten years service were released from the service. This not only created an over-aged officer personnel but also a shortage of officers at the time the Austrian army was taken into the German army in April 1938. In an effort to replenish its general staff officers it permitted young officers with four or more years service to apply and take examinations for the "Advanced Officer's Course" which covered three years work, namely, general staff course, a course in military technique, and a course in supply.

DISCIPLINE, ITS RESPONSIBILITY AND PROBLEMS.

[Disziplin, Verantwortung und Aufgabenstellung.]

A reply to a similar article which appeared in an earlier Wochenblatt.

AN ENGINEER'S IDEAS CONCERNING ANTITANK DEFENSE.

[Gedanken eines Pioniers über Panzerabwehr.]

The article "The System of Organization of Antitank Defense" (which appeared in Militär-Wochenblatt Nos. 30 and 31) inspired this article. The author agrees that the officer in charge of the antitank defense should be consulted and required to submit plans for such defense similar to the artillery commander in a division. Although the regiment is responsible for the antitank defense in its own sector, the antitank officer is available for advice and assistance.

Due to the limited range of the antitank weapons as compared with the artillery, control should be up forward rather than at division headquarters. For this reason the CP of the division antitank officer should be well forward so he can coordinate his weapons with those of the regiment and have his reserves where they are most needed.

At no time will the 135 antitank guns of a division be needed at one time on the line. This would allow one gun for every 45 yards on a 4-mile sector frontage. The reason is that no normal sector will have tank terrain which requires more than 50% of its weapons. Engineers can prepare some terrain so that tanks cannot cross it and should the enemy with his artillery attempt to destroy the mines protecting this terrain then he has lost his surprise and the depth of the mine craters will substantially slow down the tank attack.

HISTORICAL EXAMPLE OF TROOP LEADING. EXAMPLE NO. 4. PART I.

[Truppen-Kriegsgeschichte. Beispiel 4. Teil I.]

A short, excellent historical example of the problems confronting the German 41st Infantry Division on its night march to Waplitze on 28 August 1914. The article is accompanied by a map and two sketches.

NOTES FROM THE WAR IN SPAIN.

[Vom spanischen Krieg.] Colonel v. Xylander

This installment covers the events immediately preceding and leading up to the attack on Valencia and is accompanied by two sketches.

27 May 1938

THE CZECHOSLOVAKIAN ARMY.

[Wehrkraft der Tschechoslowakei.]

The peacetime strength of Czechoslovakia consists of 7 army corps, 12 infantry divisions and mountain brigades, 4 cavalry brigades (11 regiments), 7 engineer regiments, 5 signal battalions, 3 tank regiments, 12 frontier battalions and the gendarmery. Not including the last named organization, the total strength numbers 180,000 men.

Bearing in mind the training and equipment of its army, the development of war industries, Czechoslovakia with a population of 15,000,000 inhabitants, could mobilize 1,500,000 men. She seems thus to have an armed force that must be reckoned with.

3 June 1938

THE BATTLE OF SKAGGERACK AS VIEWED BY AN AMERICAN CRITIC.
[Die Skagerraksschlacht im Lichte amerikanischer kritik.] Captain Schiebe

A review of the translation of Captain Holloway H. Frost's book, "The Battle of Jutland" which recently appeared under the German title of "The Grand Fleet and the High Seas Fleet in the World War."

DEFENSE AGAINST ARMORED VEHICLES.

[Geschütz gegen Panzerwagen.] Captain Kormann

A reply to the article, "The Neutralization of the Hostile Antitank Defense During a Tank Attack," which appeared in an earlier issue of the *Wochenblatt*.

Tank versus tank defense debates have caused many headaches to advocates of each side. Naturally many claim that the decision as to who is right cannot be reached in peace time and only reached on the battle field. The author feels that this is not necessary, that the decision can be methodically deduced. He reminds us that the skilled general is he who leaves the least to chance and anticipates probabilities. This applies as well to peace time training and planning. He feels that to wait for the acid test of war is leaving too much to chance which can be solved beforehand.

The principal lesson derived from the World War was that despite the severe preparatory fire brought to bear on the defense it was impossible to reduce or neutralize all defensive positions and that numerically superior infantry forces were not able by their own means to pass through the depth of the defensive installations. This condition led to the adoption of the tank of whose success and failures we are well conversant. It is a known fact that the infantry alone with its organic weapons cannot repel a tank attack. Likewise we know that due to technical and tactical reasons the heavy and light artillery is seldom in a position where it can help the infantry during such an attack. It was soon recognized that an in-between weapon must be developed to meet this tank threat, and offered security as far as such could be offered against this tank threat. The solution is the close range or close combat artillery or antitank gun. Its tactical, organizational and technical employment was described by the author in volumes 30 and 31 of the *Wochenblatt*.

The author offers a schematic chart of his views on antitank defense.

The antitank defense scheme shows the ample use of these weapons and the chart recalls valuable historical examples which cannot be passed up. At Villers Cotterêts, 300 enemy tanks were in the assault and caused us to lose more than 300 field pieces. On 8 August we (the Germans) met the English attack with 400 field pieces but as before the infantry front was crushed, then the artillery line. The infantry had been helpless without weapons to combat the tanks and the artillery failed to adequately defend itself without the help of infantrymen.

In open warfare the attacker will not be materially slowed down by any works accomplished by the engineers. This, as we know, is due to the limited time and labor available in this type of warfare. Naturally you can fortify individual strong points but transportation difficulties would preclude the extensive use of mines to prepare a field in front of these strong points. Likewise a mined area would be a drawback to any counterattack intentions.

In his discussion the author cites an article on "Armored Accompanying Artillery" for tank attacks which appeared in *Wochenblatt* No. 38 in which he points out the fallacy of moving this type of artillery which is so vulnerable due to its visible size against well camouflaged hostile antitank guns.

Some suggest the World War type of barrage as an initial support to a tank attack. These advocates fail to realize that this type of barrage is characteristic of position warfare where enormous amounts of ammunition can be accumulated beforehand. In open warfare there will be scarcely enough ammunition for counterbattery fire.

The suggested utilization of low flying planes for silencing the hostile antitank guns also has its drawbacks. Since the hostile antitank guns are usually well camouflaged from ground and air observation and do not open fire until the tank target appears, it can be readily seen how difficult it would be for a fast flying plane to spot these guns at the critical moment when the battlefield is covered with shell bursts and dust. Then even if they do spot them and attack them with machine guns or bombs the silencing will be but temporary while they take cover.

Accompanying artillery with infantry provides a good obstacle which the tank will have difficulty in surmounting. The close combat artillery still is the best means of neutralizing a tank attack.

The author reminds us that prior to the World War the tactical decision was sought more by fire than by movement. He feels that again the solution must be sought along these lines for due to the great cost and the speed at which tanks become obsolete it is better to provide sufficient and adequate antitank artillery as a defense against the tank threat. A unit adequately equipped will develop self-confidence and assurance against the tank threat.

The author conceives the possibility of the infantry becoming merely the mobile protection of the artillery, air service and tanks. In quoting from the British Cavalry Journal and from Gen. Hawkins' article in the American Cavalry Journal, "Armies will not meet each other at the high speeds capable by tanks" but at the speeds of their infantry and that the future will find renewed emphasis on the defensive offensive.

SUPPLY PROBLEMS OCCURRING IN OPEN WARFARE.

[Vergfügungsfragen aus dem Gebiet des Bewegungskrieges.] Lieut. General Marx

At the close of the Austro-German War in 1866, General von Moltke called attention to three major shortcomings of the German armies during

this conflict. First, poor leadership not only by the generals such as Bonin, Schmidt, Vogel v. Falkenstein, but also in the next lower bracket; second, the field artillery fire had been poor; third, the supply service, especially rations, failed miserably. He immediately took steps to remedy these shortcomings. All this had to be done secretly to prevent opponents to the army from getting material to oppose them at home and to prevent foreign nations from realizing Germany's military weakness.

The staff reviewed the tactical errors and prepared manuals and remedial instruction. General von Hinderssen corrected the artillery shortcomings in fire and General von Stosch was assigned the task to radically change and improve the supply service. The results of the War of 1870 and World War show the splendid work he accomplished.

Very little has been written on supply based on World War experience, most all writings dwelling on the strategic and tactical phases and passing up the supply phase. Naturally the supply problem during position warfare was more a routine problem, but this was quite different in open warfare. At such times men were nearly always hungry or thirsty. The "iron ration" had to be continually used. The rule was that if the kitchens could not reach the troops for the evening meal then those troops that had not had a noon meal could consume their iron rations.

The question, can troops live off the land during a war of movement can be answered from experience. There is always ample fresh meat but never sufficient fruits, vegetables or bread. Bread alone cannot be secured from the land and must come from the rear. Commissary officers should be trained to be able to estimate and accumulate all commissary supplies possible from conquered terrain. In maneuvers the author often detailed officers to go into various villages and get the necessary data on how much meat, grain, vegetables, etc., could be provided.

As mentioned before, meat was always ample and in fact wasted, due to inability to preserve the surplus of a calf or steer after distribution. The author, during the war, had a mounted butcher with escort wagon for his artillery regiment, who would go into a village with his prepared receipt and permit, slaughter a steer per battalion and rejoin the column and issue to the kitchens. The vegetables were taken at those periods from the iron ration reserve.

The greatest trouble during the war was that during the mobile warfare the commissary officers always were too far in rear to serve the troops or if they did come forward they were used by the commanders as adjutants or additional staff officers.

The author deplores the tendency to forget individual cooking by troops due to their dependence on the field kitchens. The latter give a mass ration whereas by individual cooking, that is by small groups, the men feed better and more to their taste and should be resorted to as often as time and conditions permit.

In selecting commissary officers the author recommends men who know the difference between wheat, barley and oats and know what the various crops look like in the process of growth, know about meat on the hoof, etc. He deplores the selection of engineer officers or lawyers, etc., for these tasks.

IDEAS CONCERNING THE DECISIONS OF UMPIRES.

[Gedanken über Durchführung des Schiedsrichterdienstes.] Captain Meltzer

This article concerns the training of noncommissioned officer umpires for the lower units in which he stresses the importance of making realistic situations and not far-fetched solutions and situations. Conferences prior to a maneuver to stress the tactical lessons to be attained are essential. This article is of especial interest to platoon and company phases of maneuvers.

HISTORICAL EXAMPLE NO. 5: BREAKING OFF AN ATTACK. PART I
[Truppen-Kriegsgeschichte. Beispiel 5: Abbrechen des Gefechtes.
Teil I] Lieut. Colonel Greiner

An excellent regimental historical example of the Tannenberg Campaign.

The critical situation confronting the 2d Battalion 150th Infantry Regiment on 24 August 1914 at Frankenau.

CZECHOSLOVAKIA AND ITS AIRCRAFT INDUSTRY.

[Die Tschechoslowakei und ihre Luftrüstungsindustrie.]

NOTES FROM THE WAR IN SPAIN.

[Vom spanischen Krieg.] Colonel v. Xylander

The mountain warfare between Teruel and Albocacer accompanied by sketch.

10 June 1938

THE ESTONIAN ARMY.

[Heere: Estland.]

Estonia maintains a peacetime army of 11,000 men. This army consists of three infantry divisions and some independent units.

The artillery consists of eleven light batteries and eight heavy batteries, besides some antiaircraft artillery units.

The first and second divisions each has one field artillery regiment of four batteries while the third division has one of three batteries only.

There is also an antiaircraft artillery battalion of three batteries. In addition, there is also an infantry cannon company per division and some heavy seacoast guns. In total, the Estonian army has 70 light guns and 60 heavy guns.

17 June 1938

JOINT ACTION OF THE COMBAT ARMS: ARTILLERY RECONNAISSANCE.
[Vom Zusammenwirken der Waffen: Artillerieerkundung.] (I)

During the World War, artillery was carefully emplaced and counter-battery work became very difficult, due to the excellency of camouflage. When the fronts became stabilized, time was available to reconnoiter hostile artillery positions by captive balloons. The German offensives of 1918 proved the efficient reconnaissance system employed, by the enormous losses suffered by the enemy artillery. Post war requirements tend to subordinate aviation to artillery.

Artillery reconnaissance by aviation cannot always be conducted. Atmospheric and meteorological conditions often prevent efficient observation, while aviation cannot do the same work in a short time that ground reconnaissance patiently undertakes for a considerable period.

Captive balloons offer an efficient means of observation, but they are good targets for direct fire guns, while observation aviation has an ever increasing difficult task to carry out reconnaissance work, due to the improvement of anti-aircraft artillery. Only during 38 per cent of the days and nights of the year can air reconnaissance be carried out effectively.

24 June 1938

THE TRAINING OF OFFICER REPLACEMENTS.
[Zur Heranbildung des Offiziersnachwuchses.]

An article emphasizing the fact that life or decadence of an army depended on the continuous flow of trained officer replacements.

ATTACK BY HIGHLY MOBILE TROOPS AGAINST THE ENEMY FLANK
AND DEFENSE AGAINST SAME.

[Angriff schneller Truppen gegen die Flanke des Gegners und deren Abwehr.] Count von Gonnemann

An excellent historical example of the operations of the Niemen Army against Mitau during the period 14-18 July 1915, illustrated by 5 sketches.

RAPID FIRE AND ITS PROBLEMS.

[Der Schnellschutz und seine Probleme.] Major Treuhaupt

An article advocating the adoption of training in rapid fire in which every rifleman fires each shot carefully aimed as on the rifle range. Note this method has been in vogue in the United States Army for the past twenty years.

JOINT ACTION OF THE COMBAT ARMS: ARTILLERY RECONNAISSANCE.
[Vom Zusammenwirken der Waffen: Artillerieerkundung.] (II)

A review of the means of artillery reconnaissance including the following: (1) front line observation; (2) observers in trees; (3) photographic trench mortars; (4) small captive balloons or captive helicopters with photographic equipment; (5) sound and flash equipment, and (5a) armored observation trucks with telescoping mast binoculars; (6) remote controlled miniature planes for panoramic photography; (7) helicopters; (8) observation planes; (9) anti-aircraft batteries; (10) power driven helium-filled observation balloons; (11) hydrogen-filled observation balloons. By illustration the author shows the elevation at which these reconnaissance means operate and the distances from the front line at which they are normally located.

MESSING QUESTIONS.

[Zu "Verpflegungsfragen."]

A short article in which the author discusses individual cooking or group cooking before the World War and the advisability of instruction in individual cooking.

HISTORICAL EXAMPLE IN TROOP LEADING: A COUNTERATTACK.
[Truppen-Kriegsgeschichte. Ein Gegenstoss.]

An account of the counterattack action of the German 7th Infantry Division of von Einem's Third Army on 26-27 September 1918 near Sommepey, France.

ANTIAIRCRAFT DEFENSE BY A RIFLE COMPANY.

[Flugabwehr bei einer Schützenkompanie.] Wim Brandt

German regulations prescribe that fire against low-flying planes must be done by heavy and light machine guns and eventually by rifles. Experiments have proved, however, that rifle fire is comparatively inefficient.

The author advises the soldier to aim at the planes before the altitude is announced. For example, for a plane flying at 650 feet altitude the soldier should take a two-plane lead, that is to say, aim at a point two plane-lengths ahead of the plane. Aiming should be rapid and the firing instantaneous.

A machine gun in position will shoot inaccurately when there is danger of a bomb bursting in the immediate vicinity. Firing would be considerably improved by providing shelter for the gunners. If in addition, tracer bullets are used in the proportion of one to three, the trajectory of the bullet could be observed and accuracy of fire would be secured.

Estimating distances by means of a telemeter is a difficult operation, particularly in marches, when the telemeter is carried in a combat truck. Moreover, the telemeter is generally placed near one gun, while the other guns are in anti-aircraft positions. Opening and ceasing fire will be by far a more difficult operation in time of war than in time of peace.

It is suggested that instead of a telemeter, each company be provided with a grid instrument and a plotting board. A plane 10 yards in length flying at an altitude of 1,000 yards would correspond to a 10-graduation in the mil scale. The calculation of ranges would be improved, and fire could be opened quicker.

German regulations also prescribe that if the telemeter is carried in the combat truck, that the light machine gun be placed there also. Anti-aircraft should be organized in depth behind the lines as well as at the front. Each company should always have a light machine gun in readiness to open fire. On the march, men should not carry more than 400 cartridges in their belts. Each platoon should have available a machine gun equipped for anti-aircraft fire. At the halt, this machine gun should be immediately placed in position for anti-aircraft defense.

Each company should have an expert anti-aircraft noncommissioned officer, who will be in charge of all anti-aircraft measures and have under his command the three anti-aircraft machine guns. Anti-aircraft defensive measures would then have a continuous character.

MILITARY ENGINEER

January-February 1939

AFTER MUNICH, WHAT? ARMISTICE DAY REVERIE, 1938. Major Roush
THE PLATOON DEMOLITION EQUIPMENT. Captain Young
CAMPAIGN OF THE TEN THOUSAND. Lieutenant McWhorter
A BATTLE OF CIVILIANS. Major Colby

MILITARY SURGEON

December 1938

AMERICA'S PROBLEM. Colonel Ijams
THE DIVISIONAL MEDICAL SERVICE WITH SPECIAL REFERENCE TO THE
NATIONAL GUARD AND ARMY MANEUVERS. Lieut. Colonel Linthicum
EVACUATION OF CASUALTIES IN TIME OF WAR. Colonel Swenson

January 1939

THE NAVY TODAY. Admiral Leahy
THE MEDICAL DEPARTMENT OF THE NAVY 1933-1938. Rear Admiral
Rossiter
A PRACTICAL AND BRIEF PROGRAM FOR THE TEACHING OF CHEMICAL
WARFARE TO A MEDICAL RESERVE OFFICERS' TROOP SCHOOL. Lieutenants
Roller and Goldman

February 1939

THE VETERANS' ADMINISTRATION AND ITS RELATION TO NATIONAL DEFENSE. Brigadier General Hines
OBSERVATIONS ON THE MEDICAL DEPARTMENT OF THE JAPANESE NORTH
CHINA EXPEDITIONARY FORCE. Lieut. Colonel Fox
SOLDIER'S CLOTHING. Colonel Cohen

NAVAL INSTITUTE PROCEEDINGS

December 1938

APPRAISING OUR NEUTRALITY. Lieut. Commander Moran
WAR ON THE WATER FRONT. Lieut. Commander Donavin
SANTIAGO — FORTY YEARS AFTER. Meriwether

January 1939

FROM THE SIDE LINES. Lieut. Commander Sheehan
GERMAN NAVAL STRATEGY OF THE WORLD WAR. Lieut. Commander
Jamison
BETWEEN WARS IN THE FAR EAST. Lieut. Commander Lee

February 1939

THE BATTLE OF SALAMIS, 480 B.C. Edwards
PORT OF CALL. Lieutenant Jacobs

PIONIERE (Germany)

BY MAJOR E.M. BENITEZ, Coast Artillery Corps

August 1938

SCHNARNHORST, CHIEF OF THE ENGINEER CORPS 1810-1813. THE
125TH ANNIVERSARY OF HIS DEATH, 28 JUNE 1813.
[Scharnhorst, Chef des Ingenieurkorps 1810/13. Zur Erinnerung
an den 125. Todestag: 28. Juni 1813.] Major General Klingbeil

Scharnhorst served in the Hanoverian army for 20 years. In 1801, he entered the service of Prussia. In the War of 1806, he was Chief of Staff of the Prussian Army which under the command of the Duke of Brunswick was defeated at Jena and Auerstadt. He was wounded in the battle of Lützen in 1813, and died from the effects of the wounds. He was serving as Blücher's Chief of Staff in this battle.

HISTORY OF THE SAXON ENGINEER CORPS.

[Geschichte der sächsischen Pioniere.] Lieut. Colonel Sinz

This corps has existed for 240 years, having been founded in 1698 as a branch of the artillery. The corps participated in the War of 1866 on the

Austrian side, and in the Franco-German War on the Prussian side. It fought with distinction during the World War, at the end of which various units were disbanded or incorporated in German infantry regiments.

125 YEARS OF THE BAVARIAN PIONEERS.

[125 Jahre bayerische Pioniere.] Lieutenant Spörl

The Bavarian Pioneers were founded in 1813 and have served with distinction in all campaigns in which the corps has participated during its 125 years of existence. Its strength during the World War was 98 companies; after the reduction of the German army, its strength was cut down to three companies.

125 YEARS AGO: ENGINEERS AND FORTRESSES DURING THE NAPOLEONIC ERA.

[Vor 125 Jahren: Pioniere und Befestigungen in der Napoleonischen Epoche.] Major General Klingbeil

In March 1813, during the campaign of the Elbe, Eugene Beauharnais, Napoleon's stepson, had taken up a defensive position east of Magdeburg. The allied armies under Wittgenstein and Blücher, respectively, crossed the Elbe in the vicinity of Rosslau over a bridge constructed by Prussian sappers.

After the victory on Lützen on 2 May, Napoleon pursued the allies. French sappers repaired the bridge at Dresden in 16 hours.

UNWANTED FORTRESSES.

["Unerwünschte Befestigungen."] Colonel Dittmar

In the Middle Ages, towns were fortified to assert their independence. This system was gradually extended until fortifications became a system of national defense. However, the large number of Prussian fortresses that surrendered in the campaign of 1806-1807 led to the belief that fortresses were of little if any practical value. Field Marshal von Moltke said that a railway was of greater value than a fortress. The modern tendency in Germany is to avoid their extensive use, although it is generally recognized that if the southern boundary of East Prussia had not been fortified, Tannenberg would not have been won.

According to the author, fortresses hamper the movements of an army in the field, although they still possess some value.

HISTORICAL EXAMPLES OF BATTLES FOR RIVERS.

[Kampf um Flüsse in kriegsgeschichtlichen Beispielen.] Major General Tiemann

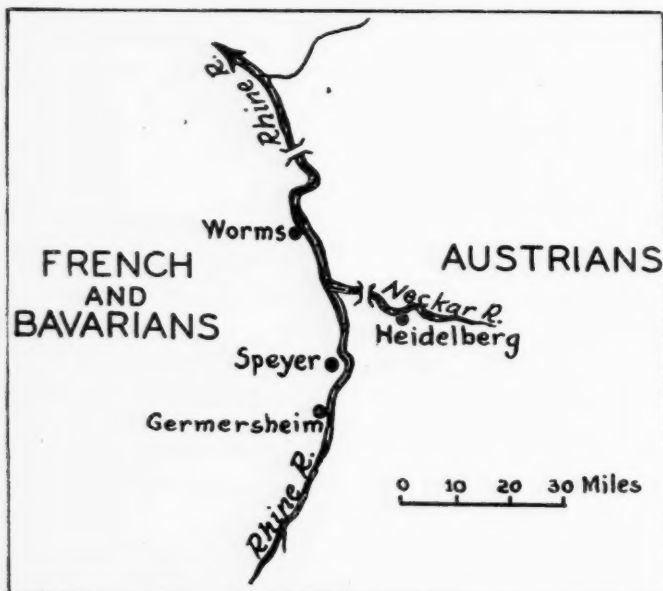
In this interesting article, General Tiemann presents a series of historical examples of river crossings, showing the correct principles that should be followed and pointing out the mistakes made on each occasion.

In 1758, during the Seven Years' War, Duke Ferdinand of Brunswick, one of Frederick the Great's generals, employed a similar stratagem against the French.



In 1812 at the beginning of the Russian Campaign, Napoleon decided to cross the Niemen at Kovno. He sent out reports that his headquarters would remain at Warsaw, about 230 miles to the southwest. Disguised as a Polish peasant, he secretly inspected the site selected for the passage. The Russians were taken completely by surprise and the crossing was successfully carried out without any opposition.

The "surprise" method, strongly advocated by Frederick the Great, has not always been followed and other great commanders have forced a crossing against a prepared enemy. Gustavus Adolphus, for example, forced the passage of the Lech against Tilly's army in 1632 by a frontal attack. He took advantage of a re-entering bend of the river, and utilizing a smoke screen succeeded in concealing his bridging operations and established a bridgehead on the opposite bank to cover the crossing.



In 1744, during the Austrian War of Succession, Prince Charles of Lorraine, Commander-in-chief of the Austrian army, concentrated his forces southwest of Heidelberg for the purpose of reconquering Lorraine from the French and the Bavarians. He built a bridge over the Neckar and another bridge over the Rhine north of Worms. He sent a force northward to deceive the enemy as to his intentions. While the hostile forces were drawn to the north he marched the bulk of his army southwards and crossed the Rhine between Speyer and Germersheim. This example of a successful ruse is quoted by Frederick the Great in his "General Principles of War."



Massena crossed the Limmat against opposition of a combined Russian and Austrian Force. He collected a number of boats to take the infantry across the river and then built a ponton bridge. A feint was made at a point farther downstream; then, while the enemy was being thus deceived, a force of about 2,000 infantry crossed the river at "A" and by daybreak had established a bridgehead on the opposite bank. With this protection, the bridge was constructed and by 9:00 AM, 15,000 Frenchmen had crossed the Limmat.

In 1864 the Prussians, covered by strong artillery support, succeeded in crossing the Alsen sound in four different places, overcoming the resistance of the Danes who were entrenched on the western bank of Alsen island.

Four examples of river crossings during the World War are discussed.



Early in August 1914, Garnier's Cavalry Division and the 34th Infantry Brigade were to cross the Meuse. The cavalry was given the mission of securing the crossings of the Meuse and the canal north of Visé, and of clearing the country north of Liege. The 34th Infantry Brigade, which was to participate in a smashing blow against Liege, was delayed at Visé because the bridge over the Meuse had been destroyed and the engineers attached to the brigade together with the two division bridge trains were still at Cologne.

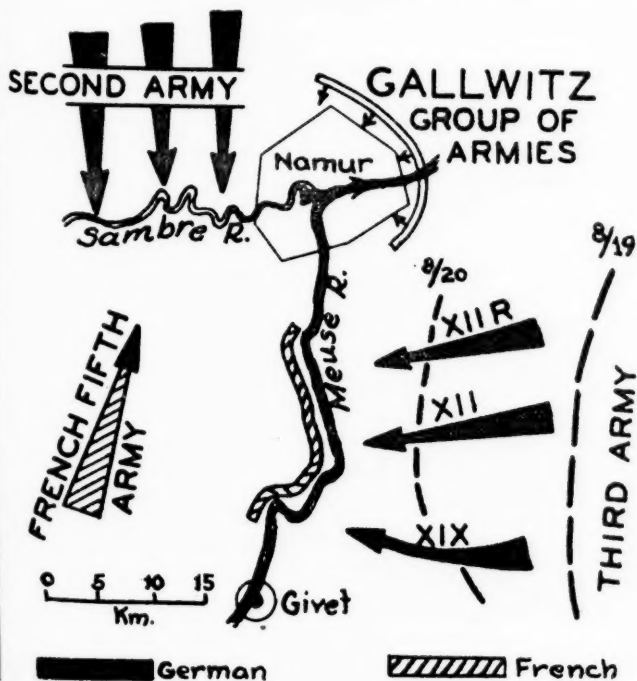
The troops commenced the crossing on 5 August and it was not until the 8th that the cavalry completed the river crossing. This delay was due to shortage of ferrying and bridging equipment. The river at Visé has a width of 165 yards, while the two bridge trains could only furnish about 135 yards for infantry or cavalry in single file, or 75 yards of bridge for vehicular traffic.

Proper river reconnaissance in peace time would have furnished valuable information. The bridging material available was not only insufficient but it was late in arriving. These mistakes enabled the 3d Belgian Division to escape safely from Liege to Tiflemont.

II

The next example is the attempted crossing of the Meuse near Sivry by the 33d Infantry Division on 30 August 1914.

Orders for the passage had to be finally cancelled on account of the many blunders committed due to the inexperience of the division staff. The



worst mistake made was that while the two engineer companies of the division were with the advanced guard the corps bridge train was marching in rear of the division, behind the ammunition columns. All roads leading to the river were blocked with vehicles—mainly artillery—and neither infantry, engineers nor bridge trains could get through.

III

PASSAGE OF THE THIRD ARMY ACROSS THE MEUSE, 23 AND 24 AUGUST 1914

The French were holding the line of the Meuse between Givet and Namur and had prepared for demolition (but not destroyed) all the bridges over the river. On 17 August, the Third Army, concentrated around and west of the Eifel, received orders to cross the Meuse and to attack the French Fifth Army which was marching northward towards the Sambre. After some delays, the Army Commander issued orders for the crossing to take place 23 August.

Many mistakes were made, the main ones committed were the following:

(1) No attempt was made to interfere with the enemy preparation of the bridges for demolition.

(2) Instead of taking advantage of the fog on the 23d to ferry the troops across, the attack was postponed for several hours. In addition, the date of the attack was fixed too late; it should have been ordered for the 22d.

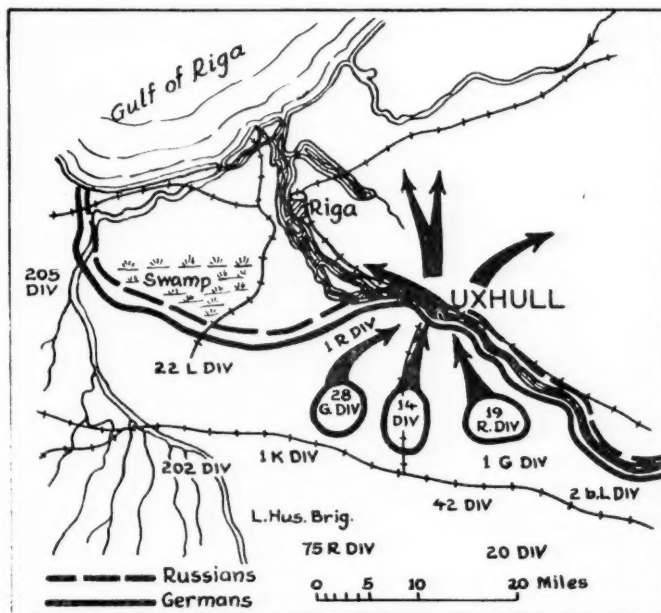
(3) The bridging train of the XIX Corps did not reach the Meuse until the 24th.

(4) The attack was concentrated on villages and bridges, where the maximum enemy resistance was to be expected.

The German artillery was not able to get across the river until the 24th. As a result of these mistakes, the French Fifth Army succeeded in escaping and the battle of the Sambre which might have been an overwhelming German victory, was just an "ordinary" success.

IV

CROSSING OF THE DUNA BY THE GERMAN EIGHTH ARMY, 1 SEPTEMBER 1917



The German Eighth Army was ordered to capture the city of Riga, situated on the northern bank of the Dvina estuary.

The point selected for the crossing was in the vicinity of a small town named Uxhull, where the river is from 275 to 330 yards wide. This site offered numerous advantages, some of which were: there was a railway leading to it; forests offered concealment of operations and there was a re-entering angle towards the attacker.

Great precautions were taken by the Germans: preventing contact between the troops and the civilian population; discontinuance of telephone messages; troops were not permitted to take their positions until the day before the attack; preparations were camouflaged; feints were made, and artillery preparations were carried out at various places along the whole front. Thus while the approximate position could not be concealed from the Russians, the enemy was not aware of the exact location of the site selected.

The attack was launched by the 28th, 14th and 19th Divisions on 1 September on a 7,700 yard front, preceded by an artillery preparation, which lasted until 9:00 AM. At this hour the infantry began to cross the river. Seventy-five pontoons had been allotted to each division. Three bridges were built; the first was completed at 1:00 PM and the other two at 2:30. The construction of a boom to keep off mines was begun at the same time, but it was not completed until three days later.

The attack was successful and Riga was captured with comparatively small losses.

By this time the Germans had acquired experience and realized that battles for river crossings require intensive preparations and the smooth cooperation of all arms. The crossing of the Dvina is an excellent example which deserves study because it can serve as a guide for future use.

QUARTERMASTER REVIEW

November-December 1938

THE ARMY SYSTEM OF FIELD MAINTENANCE OF MOTOR VEHICLES — AND ITS APPLICATION TO THE QUARTERMASTER CORPS. Lieut.Colonel Johnson
A LOOK INTO EUROPE

DIESEL ENGINES FOR THE MODERN MECHANIZED ARMY. Lieut.Colonel Sanders

January-February 1939

PAY OR PATRIOTISM. Colonel Ireland

GENERAL SUPPLIES BRANCH, SUPPLY DIVISION, O.Q.M.G.

RASSEGNA DI CULTURA MILITARE (Italy)

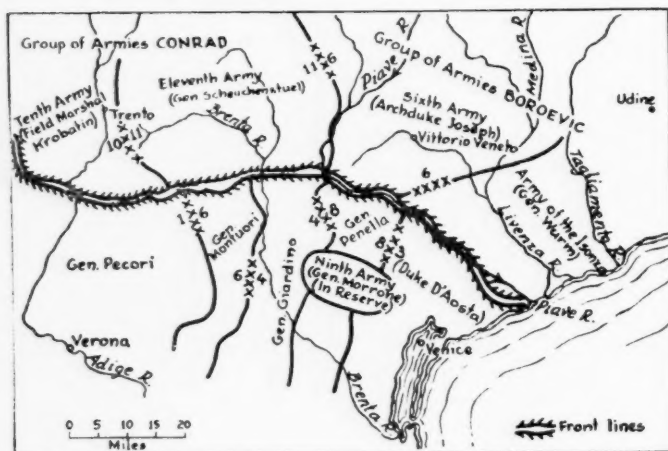
Rivista di Artiglieria e Genio

By MAJOR E.M. BENITEZ, Coast Artillery Corps

July-August 1938

THE BATTLE OF THE PIAVE.

[La battaglia del solstizio.]



BATTLE OF THE PIAVE

An Italian account of the battle of the Piave fought in June 1918.

The Austro-Hungarian army consisted of 58 divisions, a total of 716 battalions including several regiments of dismounted cavalry, 6,833 guns and 623 airplanes.

The Italian army consisted of 56 divisions (50 Italian, 3 British, 2 French, and one Czech not yet organized), making a total of 707 battalions, 7,567 guns, 653 airplanes and 4 dirigibles.

On the front shown on the map, there were 50 Austro-Hungarian divisions against 43 Italian divisions (not considering the Czech division), and 5,005 Austrian guns against 4,137 Italian field pieces.

The Italian front, particularly from the Adige River to the sea, had been strongly organized defensively.

The attack commenced with an intensive artillery preparation at three o'clock on the morning of the 15th. From the 16th to the 19th the Austrians failed to make any appreciable advance. On the 19th, the Italians launched a counter-offensive, regaining the ground lost in previous days.

In this battle, the Italians lost 90,000 men (5,799 killed, 26,335 wounded and 58,828 missing or taken prisoners). The Austrians lost 115,000 of which 55,000 belonged to Conrad's Group and 60,000 to Boroevic's Group (14,000 killed, 70,000 wounded, and 31,000 missing or taken prisoners).

"This was a great disaster," said Hindenburg. "From now on the Danubian Monarchy will no longer be a threat to Italy." According to Mussolini, the battle of the Piave was "the decisive battle of the World War."

THE ARMY OF FASCIST ITALY.

[L'esercito dell'Italia Fascista.] General Pariani

An account of the formation of the Fascist army.

The old conception of one-type division has been gradually modified and given flexibility. There are now a certain number of normal infantry divisions of two or three regiments, each with an accompanying battery; divisions similar to the one just mentioned but more adaptable to motor transportation; mountain infantry divisions adaptable to the terrain where they will be employed; motorized divisions provided with motorized artillery and

motorized trains; Alpine divisions for service in the Alps; celeri divisions with two cavalry regiments, one bersaglieri regiment with armored cars and engineers and service troops; mechanized units — a breakthrough with integral assault artillery.

The pre-war battalion which consisted of three rifle companies and one machine-gun company of eight machine guns, now has 39 automatic weapons, of which 12 are heavy, and 9 mortars, which provide powerful combat means.

The infantry regiment can support the fire of its battalions with a modern 81-mm mortar and one accompanying battery, besides providing antiaircraft and antitank protection with 20-mm and 47-mm guns.

Horse cavalry has been reinforced by fast armored cars.

The bicycle bersaglieri units have been reinforced by motorcycles with machine guns and other fast vehicles.

The field artillery has been provided with new matériel, the 75/18 field piece.

The corps and army artillery has been entirely motorized, making it suitable for the war of movement which Italy foresees and for which she is preparing.

In general, all combat arms and services have made very rapid progress during recent years.

According to the author Italy can mobilize 9,800,000 men or a total of 23% of its population.

THE BATTLE OF THE PIAVE, JUNE 1918, ACCORDING TO THE OFFICIAL AUSTRIAN ACCOUNT.

[La battaglia del giugno 1918 nella Relazione Ufficiale Austriaca.]

(I) General Bollati

This is the first instalment of a description of this battle, taken from "Austro-Hungary's Last War," Official Austrian account.

THE IMPORTANCE OF THE INTERIOR FRONT IN THE WAR OF THE FUTURE.

[L'importanza della fronte interna nella guerra avvenire.] General Bronzuoli

The author makes a plea for proper air raid precautions in order to avoid panic and disaster when war breaks out. The civilian population will be continuously threatened by aerial bombardments.

HE WHO SHUTS HIMSELF UP IS LOST.

[Chi si ferma è perduto.] Colonel Reisoli

The author emphasizes the necessity of keeping our ideas up to date in modern warfare.

TACTICAL EMPLOYMENT OF THE FRENCH LARGE UNITS.

[L'impiego tattico delle grandi unità francesi.] (I) Colonel Garone

In this instalment the author discusses the cavalry, engineers and aviation according to French Field Service Regulations. Security, reconnaissance and offensive action are analyzed in detail.

THE SINO-JAPANESE WAR.

[La guerra cino-giapponese.] (I) Colonel Oxilia

The following operations are described: The capture of Nanking in December 1937; operations after the fall of Nanking in January 1938 and the aerial bombardments of Canton and the Canton-Kowloon railway.

The Chinese had many opportunities to attack the Japanese by a Napoleonian maneuver on interior lines, but they did not possess any maneuvering ability nor knew how to take advantage of the situation. All they did was to prepare defensive positions which only served to delay the Japanese advance, but never to stop it.

THE MOTORIZED DIVISION IN A DEFENSIVE SITUATION.

[La divisione motorizzata nella manovra difensiva.] (II) Colonel Trabucchi and Colonel Quercia

ORGANIZATION OF THE FIELD SERVICE IN THE GERMAN ARMY.

[L'organizzazione dei servizi di campagna nell'esercito tedesco.] (I) Colonel Ferrero

In the first instalment the author discusses the supply services which have been reorganized to meet the needs of the modernized German army.

CONQUEST OF THE EQUATORIAL LAKES REGION.

[La conquista della regione dei laghi equatoriali.] (IV) Lieut. Colonel Terragni

Colonel Terragni concludes his account of the conquest of the Equatorial Lakes region. He points out that the advance had to be timed to commence as soon as the rainy season was over. A long halt was made at Agheremanam, during which time the conquered territory was reorganized. The local tribes caused some trouble by attacking convoys and disrupting the lines of communications, but they failed to achieve any important results. The

Italian victory at Mount Giabassire completed the conquest of the Borana country, which added a total of 43,400 square miles of conquered territory.



September 1938

THE GRAND MANEUVERS OF THE YEAR XVI.
[Le grandi esercitazioni sperimentali dell'anno XVI.]

The maneuvers referred to above took place 20 miles northeast of Tivoli, 7-11 August 1938, and have been described in detail on pages 17 and 18 of the December Quarterly. The Year XVI is the sixteenth year of what the Italians call Fascist Era.

THE BATTLE OF THE PIAVE, JUNE 1918, ACCORDING TO THE OFFICIAL AUSTRIAN ACCOUNT.
[La battaglia del giugno 1918 nella relazione ufficiale austriaca.]
(II) General Bollati

General Bollati agrees with the Austrian version of the battle in that the Austrian troops were not to be blamed for the defeat.

The lessons to be learned from this battle are: (1) that the combat value of an adversary should not be underestimated, even after he has suffered a great defeat as was the case of the Italians after their disaster at Caporetto; (2) supply of food and war material must always be assured. The Austrians who expected much from the occupation of Ukraine and Rumania were disappointed, while Germany was unable to give Austria the assistance expected by the latter. Sole reliance upon others may bring disastrous consequences.

LUDENDORFF. Prof. Folchi

While the German army was functioning with precision on the Western Front, things did not look very favorable on the Eastern Front. Russia had completed her mobilization sooner than the German command had calculated and two Russian armies had crossed the border of East Prussia and were threatening Silesia. The Supreme Command sent for Ludendorff and with his consent appointed him Chief of Staff of the Eastern Army, the command of which had just been given to Hindenburg.

It has been said that the victory of Tannenberg, which saved Russia, was made possible by the grave mistakes of the Russian generals; nevertheless, Ludendorff deserves great credit for his strategy, in spite of the risks taken.

Then came the campaign in Poland, which Hoffman, one of the brightest officers of the German General Staff, regarded as the best of Ludendorff's strategic conceptions. The coup on Warsaw failed due to insufficiency of

Austrian troops. Shortly afterwards, Ludendorff won, for the second time, a great victory on the Masurian Lakes, where in the forest of Augustowo hundreds of Russians surrendered.

In the spring of 1915, General Falkenhayn, who succeeded Moltke as Chief of Staff, initiated the great eastern offensive. Divergence of opinions arose between Falkenhayn and the Hindenburg-Ludendorff team and observers believe that had Ludendorff's views been accepted the Russian collapse would have occurred two years sooner than it actually did.

In 1916, while Falkenhayn continued hammering against Verdun on the Western Front, Conrad's offensive in the Trentino was smashed, encouraging Russia to take advantage of conditions on the Austrian Front. Rumania finally joined the Allies and declared war against the Central Powers.

In these dark hours, Hindenburg was unanimously selected as Chief of Staff with Ludendorff as Quartermaster General. Ludendorff planned the invasion of Rumania, the most brilliant campaign of the World War.

Ludendorff as quartermaster general imposed his will on every problem — large or small — the responsibility of the Imperial Chancellor, the vote of the parliamentary majority and even the wishes of the Emperor were subordinated to the German Supreme Command.

Ludendorff had the defects of his professional mentality. A master of every element, he was unable to see the aspects of other problems outside his own domain. He was Germany's flashing sword, but not its Führer; he was born a quarter of a century too soon!

THE MOTORIZED DIVISION IN A DEFENSIVE SITUATION.

[La divisione motorizzata nella manovra difensiva.] (III) Colonel Trabucchi and Colonel Quercia

ORGANIZATION OF THE FIELD SERVICE IN THE GERMAN ARMY.

[L'organizzazione dei servizi di campagna nell'esercito tedesco.] (II) Colonel Ferrero

Service Within the Division.—The ammunition supply is traced from sources in interior of the country, through army munition depots, division distributing points to front line units. The same scheme is followed regarding gasoline, oil and rations.

The most striking thing in the German supply system is its simplicity. Four separate branches have been organized to handle indispensable supplies: munitions, gas and oil; arms, and food supplies and forage. Another characteristic of the German supply system is that it is practically entirely motorized and can meet any situation, particularly in a war of movement. It conforms to the modern conception of the conduct of war.

Animal transportation is provided for part of the division, to be used where there are few roads and the terrain does not favor the use of motor transportation.

With the reorganization of its army, Germany has established a supply system which fully serves the purpose for which it has been created.

THE EMPLOYMENT OF QUARTZ STABILIZERS FOR FIELD STATIONS.

[L'impiego del quarzo piezoelettrico nelle stazioni radio campali.] Lieut. Colonel Gatta

The most practical method for stabilizing radio frequencies, especially for field stations, is that which uses "pilot" quartzes. Quartz stabilizers were used with excellent results in the Ethiopian campaign.

LOCATION OF AIRPLANES BY SOUND RANGING.

[Sopra gli attuali mezzi di scoperta di aerei non visibili.] Prof. Fernandes

If aviation has made gigantic progress since the World War, it may also be said that antiaircraft defense has not only kept pace with aviation, but actually has surpassed it. During the World War, pursuit aviation brought down five planes to one brought down by artillery. During the present war in Spain, however, this ratio has been reversed. The reason for this change has been due to the improvements of fire control system, and the accuracy has been such that in Spain it is reported that 15 rounds have proved to be sufficient to bring down any plane which happens to come within range of an antiaircraft battery at an altitude of less than 12,000 feet.

Professor Fernandes explains the principles of sound ranging. Experiments have shown that blind persons make the best listeners, not because their sense of hearing is better, but because it is more highly trained.

It is preferable to locate the sound locator on grassy rather than on rocky ground, because grass seems to absorb the sound and eliminates the echo effect. The apparatus should be located on high ground where it can receive the sound from all directions, yet not so high that it will receive all sounds and echoes from surrounding grounds.

THE PURIFICATION OF LUBRICATING OILS THAT HAVE BEEN USED.

[La rigenerazione degli olii lubrificanti usati.] Major Tatti

Lubricating oils used in internal combustion engines lose their characteristics more or less rapidly. Analysis of used oils show that oil contains mineral particles (such as silica), metallic and carbon particles and asphaltic substances. All these impurities in oil change the odor, color, specific gravity, viscosity and burning point, increasing the acidity, impurities, dilution, asphaltic substances, water and carbon residues.

These impurities may be totally or partially removed by various processes as follows:

- (1) Physical process: decanting, centrifugal action, filtration and distillation.
- (2) Chemical process, by means of which the acids are neutralized with an alkaline solution.
- (3) Physico-chemical process, which consists in treating the oil with certain earths which absorb the water and the acid and asphaltic impurities.

There are several methods used to purify oil. The author illustrates and describes the "Triploil" apparatus, which utilizes the decanting process and treats the used oil with a neutralizing solution of caustic soda. Other purifying methods are also described.

In Germany, the saving of used lubricating oil is compulsory for certain firms. Considering the expenses involved in the purifying process, purified oil is much cheaper than fresh oil.

RESERVE OFFICER

December 1938

ADAPTABILITY OF THE PARACHUTE TO MILITARY USES. Captain Emmons, JAG-Res.

January 1939

THE TEST DIVISION. Lieut.Colonel Albert
OFFENSIVE DEFENSIVE BALANCE IN HISTORY. (I) Dr. Latta

February 1939

EXPERIMENTAL DEVELOPMENT OF THE AIRPLANE AND ITS ACCESSORIES. Brigadier General Kilner

REVUE DE L'ARMEE DE L'AIR (France)

By COLONEL L.H. BRERETON, Air Corps

August 1938

AIR POWER AS A STRATEGIC ARM.

[Conditions d'efficacité stratégique de l'Aviation.] G. Kitchieff

If air power is to play the decisive role in war, it must fulfill certain requirements of strength and strategic disposition with respect to the adversary. For France, at the actual time of writing, such requirements can be obtained by a coalition with due regard for the geographical disposition of air forces as compared to those of an adversary.

FIELDS OF FIRE.

[Secteurs de feux.] Major Etienne

A discussion of defensive aircraft armament against air attack. The author is of the opinion the present type of large bomber, which is committed to a system of defense by fire alone, and not with the aid of maneuver, is at a gross disadvantage in air combat — particularly against fire from below.

FIRST TRIAL OF DEBARKING FROM AND BOARDING AN AUTOGIRO IN FLIGHT.

[La première manœuvre d'abandon et de remontée à bord d'un autogiro en vol.] E. Denois

A description of the successful trials of a passenger debarking from and boarding an autogiro by means of a line thrown to the earth, while the autogiro remained in hovering flight.

REVUE DE CAVALERIE (France)

By MAJOR L.K. TRUSCOTT, Jr., Cavalry

September-October 1938

HORSE RAISING IN EUROPE.

[Coup d'oeil sur l'élevage du cheval en Europe.] de Chevigny

This article, by the Inspector General of Breeding Studs, lists the horse population of the various European countries according to the most recent census available, and then discusses horse-raising in Europe under three general heads: physical laws; state assistance; and economic conditions.

CAVALRYMEN OF 1805.

[Cavaliers de 1805.] Louis Garros et Serreau

This article describes operations of French cavalry during the Ulm campaign of 1805 and the pursuit of the Archduke Ferdinand immediately after Mack's surrender.

Napoleon, believing the Austrians (nominally commanded by the Archduke Ferdinand but actually commanded by Mack) to be concentrated on the right bank of the Danube, had crossed to that bank. Meanwhile, Mack had crossed to the left bank, thinking to join the Russians whom he supposed to be advancing on Ratisbon, and at the same time taking advantage of the opportunity for operating against communications of the French forces. Werneck's corps began the movement to the northeast across the French line of communications, and was to be followed by the remainder of the

Austrian army. When Napoleon reached the left bank of the Danube, he realized the danger of the situation and immediately began crossing elements to protect his exposed communications. Meanwhile, Mack deduced that the French were retreating toward the Rhine and decided to suspend the movement to the northeast, and to remain at Ulm as a threat against the French rear. The Archduke Ferdinand did not believe the French to be retreating and realized the danger of remaining at Ulm. Consequently, before the Austrians were surrounded, he escaped with a detachment of cavalry, expecting to join Werneck's corps and lead it on to the northeast to join the Russians.

Werneck failed to take advantage of the road open to him through contradictory orders, and lost a full day, with the result that he too was surrounded, before the Archduke joined him. The article describes the relentless pursuit that resulted in Werneck's surrender and the relentless pursuit under unfavorable conditions of weather and terrain that destroyed the detachment fleeing with the Archduke.

A RAID INTO THE VOSGES AND ALSACE.

[Un raid dans les Vosges et l'Alsace.] Lieutenant de Montille

The author describes a test made by a detachment of the 2d Battalion Portée Dragons, consisting of a command group, one motorcycle platoon, one platoon of riflemen, one group of armored cars, drawn by lot from the battalion. The purpose of the raid was to test men and equipment in a march of more than 250 miles in rough country under conditions of winter weather. The route traversed was more than 250 miles. The test was completed in less than three days, less than 36 hours being spent in travel.

MOUNTED ACROSS THE MASSES OF AURES.

[A cheval à travers le Massif des Aures.] Lieut.Colonel Heurlier

An account of a peace-time reconnaissance by a squadron of the 3d Algerian Spahis across the mountainous region of Aures in northern Africa.

OUTLINE OF GERMAN MOTORIZATION.

[Aperçu d'ensemble sur la motorisation allemande.] Lieutenant Renault

In this article, written in May 1938, the author begins with a reference to the magnificent exhibitions of armament by the German army during the past few years, in which automotive material constituted the chief attraction. The author thinks that these exhibitions serve, not only to flatter the German passion for things military, but to symbolize German power to the world. He points out that the interest in the technique of modern armaments resulted in a flood of literature on the subject, lessened to some extent by the events in Spain, but renewed by the march of the armored division on Vienna in March. He then outlines the subject of German motorization under three general heads: organization of automotive manufacture; different types produced; value.

The author points out that the German general staff did not wait for the Third Reich to begin studies and experiments in development of motorization; and that methods and organization permitted by the Hitler dictatorship made possible the rapid development of the industrial organization. After types were adopted, the state decided the factories to produce different items, and often the manufacturer would have had no part in its development. German industry was organized to produce in quantity. The number of establishments was increased to increase output; establishments were dispersed over the country so that in case of war, destruction of a factory could only delay production, but could not stop it. The dictatorship permits this control of industry, but the government does rebate certain taxes and otherwise subsidizes manufacture.

The author describes and gives the characteristics of light armored cars, heavy armored cars, light tanks, medium tanks, tractors, and personnel carriers, illustrating each with drawings. However, he states that the characteristics given are extracted from German and foreign reviews and that their exactness should not be considered absolute. He emphasizes the small number of types of chassis, each capable of mounting several different bodies, the advanced engineering which has prevented developments from becoming obsolete, and the utilization of substitutes and other means to reduce requirements for material that might have to be imported.

The author suggests that reports that the armored division lost 30% effectiveness in the march on Vienna may be exaggerated, and that the confusion was due to precipitate departure, duality of command between regular army and Nazi party, and nervousness of leaders. He thinks too that the German staff seeks not the unbreakable vehicle but one that can be produced in great quantity and therefore easily repaired or replaced. He estimates that at the beginning of 1938 German industry was organized to produce 20,000 cross-country vehicles each year.

JAPAN AT WAR IN NORTHERN CHINA.

[Le Japon en guerre.] M. Jean Douyau

A brief article of impressions of a traveller in China.

REVUE D'INFANTERIE (France)

By MAJOR E.M. BENITEZ, Coast Artillery Corps

June 1938

THE FRENCH ARMY OF 1870.

[L'armée française de 1870.] Captain Le Guillou

The Imperial Army of 1870, consisting of 17,000 officers and 351,000 men, was not prepared to face a modern European army. Both officers and

men had proven their resistance and bravery in Algeria and in Mexico, but unfortunately the soldiers were given the right to vote and as a result politics ruled the army. Captain Le Guillou discusses at length the weaknesses of the armed forces, stating that the infantry had been neglected and it was still using obsolete formations; the cavalry and the artillery had forgotten the Napoleonic traditions while initiative at large was non-existent. In addition, its numerical inferiority prevented the army from making up for these deficiencies and consequently disaster was inevitable.

NIGHT COMBAT TRAINING IN GERMANY.

[L'instruction du combat de nuit en Allemagne.] Commandant Léger

In 1936 General von Artur-Boltz wrote a book entitled "Night Combat" which is in fact an infantry training manual.

The author believes that in a future conflict there will be many night operations. He gives a hasty sketch of that book emphasizing the training of the individual soldier and the small units, and submits his study as a modest contribution to the training of the French infantry.

THE 10TH INFANTRY DIVISION ON 30 AND 31 AUGUST 1914.

[La 10e Division d'infanterie, les 30 et 31 août 1914.] (I) General Levanier

A detailed account of the operations of this unit on 30 August 1914, with the orders issued, illustrated by maps.

July 1938

TRANSPORTATION AND LANDING OF AN AERIAL INFANTRY UNIT.

[Transport et parachutage d'une unité de l'infanterie de l'air.] Lieutenant Chevalier

Surprise, opening of hostilities without a formal declaration of war, rapidity of offensive and counteroffensive action, utilization of all the new means of warfare devised by science and industry, the sudden, overwhelming attack of assault units, the destruction of the vital points of a country, the mobilization of all the forces of a nation — these are the general events that will precede a modern conflict. However, just as it has happened in the past, the old infantry, which occupies the ground and holds it with its arms and weapons, will continue to be the indispensable factor which will in the end decide the issue.

Following a tradition dating back from many centuries to our own days, infantry has marched and fought afoot until its slowness, lack of strategic flexibility and weakness of its offensive fire-power, made her value doubtful even to herself.

Motorization and mechanization have restored her confidence. Gallieni's taxicabs led her to victory and now aviation is available to transport the infantryman.

Lieutenant Chevalier discusses the movement of an infantry unit by air and its parachute landing and concludes that aerial infantry should be considered as another legion to which perilous missions will be entrusted, and it is only by understanding the tactical employment of these units that proper missions will be intelligently assigned to them.

THE 10TH INFANTRY DIVISION ON 30 AND 31 AUGUST 1914.

[La 10e Division d'infanterie, les 30 et 31 août 1914.] (II) General Levanier

The last instalment giving an account of the operations of the above-named unit on 31 August.

REVUE MILITAIRE GENERALE (France)

By MAJOR T.R. PHILLIPS, Coast Artillery Corps

July 1938

THEOREMS OF NATIONAL DEFENSE.

[Théorèmes de Défense Nationale.] Colonel Bernard

The author examines the transformations of war and concludes that the doctrinaire soldiers of peace never catch up with actualities. He considers the extension in depth of fire-power by means of the bomber and the tremendous demands on the internal resources of the country the primary new factor of modern war. He foresees the necessity of economic mobilization and of a single high command of all military, naval, aerial, and economic resources. To effectuate this, he recommends a reorganization of the cabinet into three major ministries, namely: military affairs, economics, and colonies. These ministers, or vice-presidents, will have for their fields the following:

- First: the ministries of war, navy, air, and perhaps a new ministry of armament;
- Second: the ministries of industry, commerce, and agriculture, together with a liaison with the minister of finances;
- Third: the ministry of colonies.

The Premier would be furnished with a superior council of national defense with a permanent committee and a general secretariat upon which would devolve the establishment of a plan of war and a general organization of the nation for times of crises. The vice-president of military affairs would be provided with a superior military committee with the principal role of completing the general plan of terrestrial, naval, and aerial operations, and

coordinating the three branches. The vice-president for economics would have a national economic council.

GENERAL RENNENKAMPF AND THE BATTLE OF TANNENBERG.

[Le général Rennenkampf et la bataille de Tannenberg.] General Niessel

(General Niessel was head of the French Military Mission in Russia during the World War, and as such, is particularly qualified to write on Russian operations.)

Russia and France were forced, in my opinion, to fight a war willd by Germany at the moment judged by her to be the most favorable. Nevertheless, we had some chance of success. If it was not realized sooner, a great deal of the cause was due to the disaster of the Second Russian Army of General Samsonov in East Prussia in the series of combats known as the Battle of Tannenberg, although at the same time the First Army, commanded by General Rennenkampf, had a few days before gained an undeniable success at Gumbinnen.

The question that needs to be known is whether General Rennenkampf could have progressed fast enough toward the west to prevent the destruction of General Samsonov's army, and this has been discussed passionately. Unpublished documents throw some new light on the matter. A great deal of the Russian writing of these battles was done at the command of the Bolshevik government and had for its purpose propaganda to prove the incompetence of capitalist Russia and its allies.

No one in France denies the service rendered our army by the early advance of General Rennenkampf in the middle of August. His invasion of East Prussia and his victory at Gumbinnen on 20 August made a strong impression in the German High Command. General Dupont, head of the Second Section of Genral Joffre's Staff, wrote on this subject: "Two corps were taken from the French front. The reserve corps of the guard from the Army of von Bulow, and the XI Corps from von Hausen's. A division of cavalry accompanied them. This enterprise was perhaps our salvation. Suppose the reserve corps of the guard had been in its place on 7 September between Bulow and Kluck, and the XI Corps with the Saxon Cavalry Division with von Hausen's Army on 9 September at Fère-Champenoise. What consequences?"

In reality, if the offensives of the two Russian armies which invaded East Prussia had an unfortunate outcome, it was due primarily to poor Russian preparation for war. General Niessel concludes that the most important cause of the Russian reverses was the defective strategic conception of the employment of the First and Second Russian Armies. In making this plan it had been forgotten that the German troops were not fixed in place, that the dense railway net of East Prussia allowed them to concentrate rapidly at successive points against the two Russian armies. The Second Army entered into action 93 miles airline from the First Army and could not be supported by it for eight days at least, even if this latter had moved without interruption. The Battle of Gumbinnen took place on 20 August, that of Tannenberg commenced the 24th, and in place of prescribing that the First Army march without delay to join the Second, General Jilinsky obstinately oriented it towards Königsberg, one hundred miles north of the region where the Battle of Tannenberg was fought.

The defective directives of the Army Group Commander, whose General Staff was far from the executants and had imperfect liaison, played an important role in the unfortunate results of the invasion of East Prussia. The weakness of the local commanders, due to political choice of certain generals of high rank, aggravated the dangers resulting from the bad initial situation as well as from incomplete mobilization preparations, particularly with reference to supply.

Another cause of the slow march of the First Army after Gumbinnen was the worthlessness of the cavalry corps, for energetic employment of the cavalry would have rendered the Battle of Gumbinnen almost decisive, and in any case would have ripped the screen maintained by the inferior German cavalry and clarified the situation.

The courage and endurance showed by certain large Russian units does not excuse the mediocre conduct of others. The High Command, the quality of the officers, and the instruction of the soldiers combined to make these failures. Many generals and colonels should have been relieved of their commands. The so-called reserve regiments grouped into divisions and engaged as units were too often without any real consistency because their officers' corps was second-rate and the reservists had only mediocre instruction. The fatigue of the soldiers was increased by faulty organization of the marches and frequent failure of food supply.

These multiple causes brought about the ruin of Samsonov's Army and the heavy losses which Rennenkampf's Army showed itself capable of supporting. Everything has its effect in war and assists in the victory or defeat. Conceptions of the High Command, its worth and its energy, are precious factors in success, but the worth of the troops themselves — fruit of peace-time instruction — is not less indispensable. This latter depends essentially upon the worth of the commander, upon his determination to neglect nothing in the preparation for war.

Victory cannot be the effect of chance. It is in large part the fruit of modest labor, implacably constant and obscure over a long period of years: in the army to train officers and men; in the nation to animate all social classes with the ardent will to serve their country on the fields of battle as in the works of peace.

REFLECTIONS ON ARMAMENT PROBLEMS.

[Quelques réflexions sur les problèmes d'armement.] By Currus

Military history teaches us that armament plays an essential role in problems of organization. It is not surprising then that reflections on arma-

ment open up problems of organization. Modern armament has become terribly expensive. That of a division today costs eight or nine times as much as that of a 1914 division, considering only the arms and neglecting the equipment and stocks of ammunition.

No state appears rich enough to construct stocks to keep up to date and maintain sufficient armament at the top of technical progress for all its mobilizable male population. Since modern armament can only be possessed in reduced quantity, is it not fitting to have it served by selected specialists in order to get the greatest results from it? One can only answer "yes." Some have concluded that this indicates a return to the time of professional armies.

Pushing the analysis further, one sees that the essential cause of the evolution noted is the automatic arm. It is this that has made attack more difficult and requires abundant and expensive offensive material, but it is this also that permits the defensive to remain relatively simple and inexpensive, for the automatic arms of small caliber do not cost much. "Attack a position with cannon, defend it with rifles," said Napoleon. The formula can be transposed for the attack and defense of modern positions: in the offensive the essential arm is the cannon. To this should be added, for completeness, tanks and infantry mortars. In the defensive it is the automatic arms completed today by antitank weapons.

There is a contradiction between the needs of the offensive and the defensive. To defend themselves, an organization never has enough automatic arms and antitank weapons. To attack, it demands cannon and tanks. If organically one wishes to give it all the means necessary both for the defensive and the offensive, the result will be monstrous units impossible to command. Wisdom would be to give organically only the means usable in all circumstances, and to reinforce them and adapt them for their mission of the moment by the attachment of supplementary means. It is a system of general reserves. It was used first with artillery and then with tanks. The first conclusion of this study is that the extension of the system of general reserves is possible and desirable.

August 1938

STRENGTH AND WEAKNESS OF THE BRITISH EMPIRE.

[Forces et faiblesses de l'empire britannique.] Commandant Villate

The author describes the physical extent of the British empire, its organization, its wealth, and discusses its imperial strategy and regional problems.

Powerful on the sea and in the air, Great Britain relies on its alliances for strength on the ground. Her maritime power has often been misunderstood and not used by her allies, and she does not wish this to continue. She desires the power to direct the coalition as much by her naval strategy as by her air power and financial strength. Everything must be put to play to induce the dominions to cooperate in the defense of the empire.

She no longer can be isolated and requires alliances to defend her world-wide interests. They are both the cause of weakness and strength. The proud words of Sir Walter Raleigh: "Whoever commands the sea controls commerce. Whoever controls commerce disposes of the wealth of the world and, in consequence, dominates the world itself," are still true. But it imposes costly duties and military precautions. When one studies this colonial empire it appears to resemble a colossus with feet of clay. Between Europe and the dominions will not England find herself obliged to choose, either whether to turn their shoulders to Europe and take refuge in isolation or to find itself abandoned by the dominions and forced to depend upon allies in Europe. According to Siegfried: "England will not choose. Faithful to her tradition and at the same time to her genius, she will remain between the two groups without giving herself to either. Persistence and suppleness have always been two profound traits of the British nation."

WHAT CAN ONE EXPECT FROM MODERN ANTI-AIRCRAFT ARTILLERY? [Que peut-on attendre d'une D.C.A. moderne?] Commandant Courbis

When public opinion is preoccupied with the means of avoiding the threat of hostile aviation, it thinks irresistibly of pursuit aviation. It forgets that mastery of the air has never been realized except during a very short period on our front, chases from its memory the implications of soldiers flown over or attacked by German airplanes, without interference, and the civilians at the rear surprised by bombardment that French aviation could not prevent. It remembers only the exploits of the great aces of the World War, and without further reflection deduces the conclusion that all France needs to be well defended is powerful pursuit aviation.

For anti-aircraft artillery, on the contrary, time has a different effect. When it is thought about at all, it is to recall only the myriad white smoke puffs in the sky following a black target which they never reached. At the best it is conceded that anti-aircraft artillery was useful in forcing a few observation airplanes to fly high or in requiring a few bombardment airplanes to turn back.

Although anti-aircraft artillery had a value superior to that indicated by statistics, the part due to it is far from representing the majority of the allied successes against aircraft. But it should be noted that the success of anti-aircraft artillery was attained almost without loss of men and material, and that this is not true of pursuit aviation. The latter lost, in 1918, 658 airplanes and about 900 pilots, one-half of whom were killed.

Besides, we should take into account the relative strength of the means of the two arms. In 1918 the anti-aircraft artillery used between 415 and 544 cannon. It should be remembered that they were used during the entire period, without being replaced and that most of them are still in service.

Aviation, on the contrary, used between 750 and 1400 airplanes with approximately equal numbers immobilized in depots or schools. Further-

more, they had to be replaced at an average of 50% a month, which led to the placing in service during this time of almost 5,000 airplanes.

Although much more sensitive to atmospheric conditions pursuit is not, even in good weather, always available. Generally it is estimated that two flights a day per plane can be required after deducting 20% of the strength as not available. These figures appear to be considerably above reality. If we take, for example, the 15th Pursuit Group, with 6 squadrons of 15 airplanes each, say 90 airplanes, we see that in April and May, 1917, it made 3,044 flights, 33.8 per plane, or an average of one every two days per plane, and at this time our old model observation airplanes imperiously required protection. In 1918, one finds analogous proportions. On 11 June, of the 300 planes present in the air division, there were only 19 flights. One month later, 15 July, with squadrons reconstituted and reaching effectives of almost 400 planes, only 314 flights were made. If we study the activity of this group in April and May, 1917, we see that there were on our side 21 pilots killed or wounded, and on the enemy side 21 planes known to be brought down and 31 more claimed. This corresponds at the maximum to 73 decisive combats, but the 15th Pursuit Group declares that they engaged in 694 combats. If this is true, 90% of them were without result. It is not certain that 90% of the anti-aircraft fire would have been.

The author concludes that the improvement in modern anti-aircraft artillery has surpassed that of aircraft with reference to the relative difficulty of bringing planes down or escaping from anti-aircraft fire. He believes that in future conflict its success will be very much greater than that of the anti-aircraft artillery of the World War and this he considers not to be negligible.

THE SECURITY OF FRANCE.

[La sécurité de la France.] Boutry

A study of a morale factor in the security of the nation and the role it should play in the development of patriotism and discipline.

THE JAPANESE PROBLEM.

[Le problème japonais.] Captain Henry

The drama now being played in the Far East has the appearance of a sporadic conflict but in reality is one of the links of a chain forged by the carelessness of the whites. The Japanese is the descendant of a race supposed to have been transplanted in ancient times from a continent or islands now covered by the Pacific Ocean. He is not a yellow like the Chinese or Mongol, or Manchurian. He is not a merchant and if he is an industrialist, it is by necessity. His spirit is disciplined, religious, courageous, proud and artistic. It is like that of the conqueror, sailor, the great noble, or a commander. It is made to command and direct, not to submit.

However, this spirit possesses the faculty of adaptation to an unusual degree, permitting the Japanese to accommodate himself to misfortune and, in case of need, to support the severest blows with admirable serenity. The Japanese has an over-developed sense of honor which does not permit him to allow an injury to go unavenged. His own death alone can make up for having been the cause of any injury to essential moral principles. This vengeance or self-punishment can wait as long as necessary but it always will be realized.

The Japanese were awakened from their isolation in 1854 when the Americans bombarded Kagoshima. The Japanese delegates sent to make arrangements got on the naval ship, which was a terrible novelty to them, looked around, restrained their astonishment, understood and ceded before the evidence of force. The Diamio, head of the province, having received this insult, washed away his shame by committing hara kiri. But the lesson brought its fruits. The horrible national injury demanded reparation. To make it, it was necessary to become stronger.

The Japanese worked toward this end ardently, patiently, and with the extraordinary intelligence that differentiates them from the other yellow peoples. They digested massive doses of new sciences, they created new factories and shipyards. Finally, in 1894, the first trial of the new power came in the conquest of Korea, Formosa and Liao Tung peninsula with Port Arthur. This has continued with the Boxer War, Russo-Japanese War, the grabbing of German concessions in China and the Pacific islands, and now the conquest of Manchuria and much of China.

Tomorrow all the parts of China not desert or half desert, the Province Amur, and perhaps Australia, will pass under Japanese control. This is necessary not only for reasons of prestige but also to satisfy the material needs of their population, which is becoming more and more numerous. The Japanese are people who know how to will, the Russians are Slavs, the Chinese are incapable of administering or organizing others. Besides, the immense majority of yellow people which form the part of China held by Japan do not want to fight and are glad to receive the Japanese soldier, for under his protection they can finally live in order and prosperity and increase their individual commerce. From now on, having formed a homogeneous whole, including agriculture, mines, commerce (gifts of China), industry, force, authority (gifts of Japan), Japan will speak as master and demand what it wants.

How soon? This remains a mystery. It depends upon so many things. Japan knows how to wait and will not forget, particularly since the whites have never missed an occasion, in their blind vanity, to make the little Japanese drink bitter doses, so much and so well that the initial national offense finds itself amplified by the sum of all these individual offenses. The result will be the expulsion of the whites from the Far East and the near territories, and Japan will be sole master in a nearer future than we think. Neither the unfortunate Chinese individualist nor the Soviet Union, nor the powerful United States of America, can do anything to change it. Only the complete, definitive, and sincere union of all whites, federated for the life of the race, will be able to have a chance of success of changing the physiognomy of the foreseeable future.

September 1938

THE BATTLE OF JUNE 1918, IN ITALY.

[La bataille de juin 1918 en Italie.] General Bollati

The second battle of the Piave, the battle of June 1918, is not very well known. General Bollati of the Italian army examines it, using the narrative in the Kriegsmuseum of the Austrian army. The forces involved were about equal, except in aviation, the Austrians having 210 airplanes available, and the Italians 485. Approximately 500,000 men and 7,000 cannons were used on each side. The Austrians attacked with about 1/5 of their 50 divisions in reserve, while the Italian reserves amounted to 1/3 of their forces.

The Austrian plan of attack contemplated two converging penetrations. One across the lower Piave, moving to the southwest, while the other moved directly south astride the Brenta. This would pinch out a large and fruitful piece of Italian territory, capture Italian supply depots and enable the Austrian army to progress at least to the Adige. The command was composed of two groups of armies under the command of Generals Conrad and Boroëvic. Both of these generals considered their operation the main attack of the force and asked superior means. The High Command refused to settle this dispute and said that the attacks of each group of armies were of equal importance.

The Italians were not surprised by the attack and their counterpreparation started ahead of the Austrian artillery preparation. The Italian counterpreparation was extremely effective and caused severe Austrian losses, but did not delay the attack. The feint by the Tenth Army had no success. The attack across the Piave by General Boroëvic's army group succeeded in crossing the river on the front of about 13 miles and were held there. The Italian superiority in aviation interfered seriously with these troops after they had crossed. The ponton bridges were bombed and machine gunned constantly, and the troops across the Piave were cut off from their supplies and without substantial artillery support. After very severe battles the Austrians withdrew to their original lines.

Neither of the Austrian penetrations was given a sufficient superiority in force to have been successful. The offensive was on too grand a scale for the means available. The Italians had the advantage of interior lines and were able to move their reserves with facility. The Austrians were unable to reinforce the different parts of their lines since they were separated by high mountains. Austrian difficulties were enhanced by shortage of food and fodder. They had ample supplies of ammunition but lacked transport to bring it up as rapidly as needed. The Austrians undoubtedly were surprised by the effective reconstitution of the Italian armies after the disastrous defeat suffered at Caporetto in the winter of 1917. The failure of this offensive had serious results in the home country where there already was a shortage of food and considerable dissatisfaction. The failure of the offensive had almost as important results as any defeat would have had. It was the beginning of the end of the Austro-Hungarian monarchy.

THE DEFENSIVE ORGANIZATION OF THE FRENCH OVERSEAS EMPIRE.

[L'organisation défensive de l'empire français d'outre-mer.] Lieut. Colonel Sarrat

Three decrees of May 1938, have added to the defensive organization of the French Colonial Empire. The first of these creates a Chief of the General Staff for the Colonies. The second makes the Minister of the Colonies take a place on the permanent committee of national defense. But the third, coordination of measures of national defense exercised by the Ministry of National Defense, extends to the Department of Colonies.

INFANTRY IN THE SPANISH WAR.

[L'infanterie dans la guerre d'Espagne.] Commandant Andriot

The Spanish Civil War gives us a chance to evaluate our tactical methods. Our matériel and combat procedures get lots of tests on maps and in maneuvers, but these trials are of little account compared to the vigorous struggles in Spain. Nevertheless, conclusions should be drawn from the Spanish War with caution. This is particularly the case because frequently the contenders are armed with such small quantities of certain weapons that their value is hardly proven. Likewise, many of the soldiers are poorly instructed and do not make the best use of the matériel they have.

The infantry of both contenders is heterogeneous. The best troops are those coming from Morocco, both the Foreign Legionnaires and the Moors. In general, the training of the Insurgents is superior to that of the governmental militia. However, two years of war has given them all very practical instruction, and although they can not present the aspect of well-trained infantry of the larger European powers, many units are very competent fighters. The Spanish War shows that infantry is still preponderant in battle. As always, the infantrymen conquer, occupy and hold ground. When all is said and done they decide the success.

The progress of armament, both in quality and quantity, has not permitted the realization of the dream of economizing on men by substituting matériel for them. The Spanish War gives no hope to Utopians, who visualize a future war waged solely with tanks, airplanes and cannon. At times advances have been gained solely by matériel; but final success has always escaped if the terrain conquered was not occupied by the infantry. Many times large numbers of airplanes attacking ground troops have dispersed them momentarily and inflicted severe losses on them. But nothing remained from these attacks unless the infantry occupied the ground.

The inexperienced government troops naturally have sought to substitute matériel for themselves in combat. The first means at hand was to employ tanks. For example: On 29 October 1936, the Government forces

unleashed a strong counterattack on the right flank of the Insurgents operating in the direction of Madrid. They had a large number of tanks which broke through the first enemy line without trouble. The militia neglected to effectuate this operation themselves and advanced some time after their tanks. They were completely surprised to fall under the fire of automatic arms which had remained intact in the first line. The tanks moving ahead conquered the terrain momentarily but when they came under fire of anti-tank weapons they were incapable of occupying or keeping it. Left to themselves many were placed out of action and the rest were forced to turn around and go back.

Matériel is only as good as those who use it. In enumerable instances troops have gained no advantage from the weapons in their possession, or with which they were supposed to act in intimate liaison. Matériel does not produce all its effects, except when it is served by an excellent infantry.

Much has been written on the increased power of the defensive. While it is true that the progress in matériel favors the defensive nothing indicates that it makes the offensive impracticable. The success of the Insurgents in the Aragon offensive is a sufficient commentary to disprove the statements of writers who have drawn excessive lessons with too little information. One can say, however, that a strong defensive requires tactical, technical and moral qualities that improvised troops do not possess. The easy rupture of the "Iron Ring" around Bilbao indicates that too much dependence should not be placed upon fortification alone. Even the Maginot Line, in spite of its tactical and technical perfection, is not invincible by itself. It can not be defended by "levée en masse" but will require troops of the top ability and training.

Although the progress of armament has not realized supremacy for the defensive, that of the infantry in particular, permits it to limit successes by the rapid formation of new lines. This leads to stabilization. There is nothing new about this for the same thing happened in the World War. But many critics considered that stabilization in the World War was the result of special conditions and that they would not let themselves be drawn into it in the future. Some thought that motorization would give extreme mobility to operations and that this would tend to suppress stabilization. In Spain motorization has had no such consequences. The operations there have furnished confirmation that the defeated infantry establishes itself more easily than in the past on a position after a movement in retreat.

Both sides in Spain have used large numbers of tanks. To discuss the question one should have some idea of the matériel employed. The tanks are of German, Italian and Russian manufacture.

The German tanks are light tanks of 6 tons. Their armament includes 2 machine guns. The armor varies from 7 to 13 millimeters. The maximum speed is 31 miles per hour.

The Italian tanks are the Fiat-Ansaldo, Model 1933. Their weight is a little over 3 tons. Their maximum speed is about 27 miles an hour. Their armor varies from 8 to 13 millimeters. Their armament includes one machine gun, and later two. When firing the gunner is very vulnerable.

Two types of Russian tanks are in use. The T-26 weighs 8½ tons. Its armament consists of a 45-millimeter cannon and a machine gun, all in a turret. Its maximum armor is 13 millimeters. Its speed is about 20 miles an hour. Spanish built tanks copied from this Russian model (which in turn is a copy of the Vickers) have heavier armor and lower speed. The Russian T-28 is a heavy tank of 20 tons weight. It has a 45 millimeter cannon and 3 machine guns. Its maximum speed is 25 miles an hour. The heavy Russian tank uses considerable rubber in its undercarriage, which makes it easy to set on fire.

The German and Italian tanks used in Spain have not given entire satisfaction. Great hopes were raised in German on their light tank, which they adopted in 1935. It was chosen as the principal armored vehicle of their armored divisions. Its great mobility was particularly admired. The comparative failure of both the Italian and German light tanks is due to the development of antitank weapons. All light tanks of whatever manufacture are insufficiently armored to withstand the fire of antitank guns. Antitank guns were developed after the development of light tanks. This in turn forces the development of tanks armored heavily enough to resist the fire of the small antitank weapons.

Antitank guns are getting their first trial in Spain. They have showed themselves much more perfected than the tanks themselves. The 20 millimeter Oerlikon antitank gun will penetrate 30 millimeters (1 1/5 inches) of armor at 500 yards. This gun weighs about 700 pounds. It has a rate of fire of 300 rounds per minute. The Hotchkiss 25 millimeter cannon, with a rate of fire of 180 rounds per minute, weighs 1,760 pounds. This weight is a considerable disadvantage since it makes it difficult to get the cannon into a position in the forward areas. It is known that a German 47 millimeter antitank cannon is in use, but no information is available as to its characteristics.

The Spanish War has shown that the weapon giving the best support to attack infantry is a curve-fire cannon. It can reach the defenders of positions behind their ramparts. The insurgent infantry is very well supplied with mortars and obtains the best results with them. These are the best of all defensive weapons. They are very helpful in solving what is called "the machine gun problem."

Both sides move infantry in motors. They have become so accustomed to this that it is often done for short distances and under unfavorable circumstances. In many cases they have come under artillery fire. The infantry should not get the habit of waiting around for vehicles to transport them.

Aviation flying low has attacked infantry on many occasions. General Duval states that machine guns are "practically useless against low-flying planes." It is not known whether this lack of success rises from the difficulty of following the extremely rapid planes or from lack of instruction of the troops. One judges from the operations in Spain that aviation will intervene in the ground battles more and more often. It is necessary to be prepared

to receive these attacks and increase the infantry machine-gun instruction for antiaircraft fire.

To summarize, the Spanish War can furnish us material for numerous reflections dealing with the infantry which place it in the primary roll. It should be studied in spite of its differences with a colossal armed conflict which would involve armies in formidable effectiveness and involve careful preparation. It permits us to reason on certain concrete cases and to see the infantry struggling with certain new realities of battle.

THE UNKNOWN JAPANESE.

[L'inconnue japonaise.] Lieutenant Dalstein

Apparently the Japanese are "unknown" to the French since there is little in this article that all American newspaper readers do not know. One paragraph is of some interest and it reads as follows:

The Japanese do not see any menace against them in American diplomacy. This is so confused in appearance that an American statesman was able to say that it devotes "half its efforts to explaining to the American public and the other half explaining to foreigners." The Japanese believe that the United States, with an already difficult internal situation, will see with pleasure Japanese lay aside for a time its potential control of the use of the Pacific and lose itself more and more in China to become a Continental Power. They believe also that the United States, the best client and the principal supplier of Japan, and having but slight investments in China, would prefer to reduce their exports to the Asiatic Continent rather than bear the cost of a war which would benefit only England. Perhaps finally the Japanese believe that the United States, whose economic tendencies are now directed toward Europe and South America, will be pleased to see Japan menace European wealth in China, which might have helped them to work out of American economic control.

THE ROAD NET AND MILITARY NEEDS.

[Réseau routier et besoins militaires.] Lieut.Colonel Montigny

This study shows the importance of developing a French road net that will provide uninterrupted itineraries obtained by tunneling rivers instead of bridging them. He believes these tunnels should be fortified. He does not consider that the expense of tunnels is much greater than that of bridges and believes that tunnels are practically indestructible by aerial bombardment.

REVUE MILITAIRE SUISSE (Switzerland)

BY LIEUTENANT COLONEL L.W. HILLIARD, Field Artillery-Reserve

August 1938

WITH REFERENCE TO THE SPEED OF SOLDIERS IN COMBAT.

[A propos de la vitesse du fantassin au combat.] General Clément-Grandcourt

These are observations of other military writers pertaining to the question of speed in combat. They give us further information on this subject which was treated in the June issue of this magazine with viewpoints taken from a German source. The author advances the thought that speed is not always the desired factor. Mass and power are sought at times, such as under conditions we find in position warfare.

This article deals almost entirely with the speed of foot soldiers. It should be of interest in a study of the conduct of infantry, but becomes less applicable in the present trend toward mechanization.

OFFENSIVE ARMY OR DEFENSIVE ARMY.

[Armée offensive ou armée défensive?] Colonel Lecomte

This article deals with the extensive discussion in Switzerland as to whether their army should be trained primarily for offensive or defensive action. It gives their understanding of each type of action and points out where they are closely connected, such as in the active defense. The thought is expressed that only armies possessing great strength could be considered suitable for offensive action, while a lesser power should be more interested in building up a good defensive force. The author is convinced that while his country should be prepared to utilize three modes of combat, to attack, to defend, or to retreat, he does not hesitate to say that in Switzerland the major part of training should be for defensive action.

INSTRUCTION AND EDUCATION.

[Instruction et éducation.] Lieut.Colonel Mayer

Generally, preparation of troops for war is understood to include: first, individual instruction to recruits to bear arms; then, the training of troops to use special equipment, such as machine guns, tanks, artillery matériel, and vehicles of all kinds. Finally, we come to unit training under the unit commander. Companies, squadrons, and batteries are like bands of musicians under the direction of a band leader. The variation in aptness and personalities of the individuals correspond to the diversity in instruments and unequal value of the artist; subordination to the baton, which beats the measure, corresponds to discipline: it is this which uses different beats and different notes to obtain a harmonious ensemble effect conforming to the intentions of the composer. A troop should be obedient to its chief to execute with the greatest possible accord that which its commander requires of it.

Living together in the company, squadron or battery, permits officers to become acquainted with those they call, "Their Men." These officers

can determine by experience each soldier's capabilities, intelligence, knowledge, and fitness for the tasks to be assigned him. By habit, also, bonds between assistants and comrades are created which make the organization function smoothly in peace time and carry efficiency to the maximum, if they continue, during war. This results in forming a sort of "esprit de corps," which is born, so to speak, by spontaneous combustion.

In Switzerland, the instruction of soldiers is conducted principally by specialists who are employed exclusively in the preparation of soldiers for war. In France and Germany, on the contrary, training and education is left largely to those officers who will command them in battle. However, there are some exceptions, as in the artillery, where cannoneers are trained by their instructors, while drivers are trained by others. In France, it is often claimed that the value of officers depends more upon their ability as instructors than their valor in action.

As to exactly how much authority and how much familiarity officers should show toward their men, individuals must choose depending upon the character and personality of the officer. It is highly necessary to choose what is best to say to the young soldiers. Consideration must be given to the way they have been brought up.

The shortening of the term of service has made difficult the complete training of the soldier. Time doesn't permit officers to instill in them all those desirable qualities which soldiers should possess. Unfortunately, they often return to civil life quite satisfied to lay away their uniform for all time.

Switzerland and England have solved this problem of shorter term of service by giving the young soldiers the practical and technical training, while the matter of patriotism is felt to be born in them. In event of war, it should not be difficult to complete their training by instilling in them such soldierly qualities as devotion to duty under fatigue and privations and courage in the face of danger.

GERMAN OPINIONS: CLOSE COMBAT.

[Opinions allemandes: Le combat rapproché.]

In the "Truppendienst," M. Robert Eylo has recently examined conditions of close combat and stated his point of view, found to be extremely interesting, in this field.

Certainly, he writes, one has much to say lately on this subject, and many opinions have been expressed to soldiers with respect to this combat and great importance is staked upon it: besides the fundamental exercises of boxing and jiu-jitsu, they study the use of the bayonet, sword, bladed shovel, gun-butt, and hear a great deal about rifle practice.

But the question is still far from being settled, and above all, it should be necessary to examine how close combat was executed in the last great World War. Here we have contradictory statements; some say that one was unable to employ close combat, for when two adversaries raise their arms, fighting with the grenade at a distance, this does not count as close combat. Others say that they have fired at random, played with the gun-butt, with the grenade, that it was a fight that finished in short time. One of the combatants surrenders or flees; in the meantime, they have brought out little information for actual instruction.

As to the wars of Gran-Chaco, Abyssinia, Spain, the Far East, there was nothing new in this respect, except in the Gran-Chaco. With hue and cry, they have demanded submachine guns.

And, meanwhile, the ways of combat are singularly modified from the course followed in the War of 1914-1918; today, to study modern close combat it is necessary to go to North America and examine the actions of bands of desperadoes, who indulge in criminal pursuits; here the point in question is to be or not to be a prisoner. The means they employ, refined by the best of armaments, armaments which, viewed from the high cost evidently can not be used freely in the army, is to make use of fire and always to shoot.

What do they use for arms? The submachine gun, the light machine gun, and the automatic pistol. Each combatant has generally two automatic pistols, reloading not always being possible in this particular combat; he is always sure to have knives, black-jacks, repeating shotguns, if he needs them, but all this armament can not be carried by a combat group.

The contest between gangsters is a local engagement, while infantry must fight at a considerable distance; one cannot progress to a distance shorter than two hundred meters without the use of some arm of close combat. You could introduce some repeating gun into the combat group, or you could give them submachine guns with a trajectory much more extended, but the combat in close quarters requires the hand grenade.

If, now, while waiting for a submachine gun with a grazing trajectory it is necessary to employ an automatic rifle, we must ask why this gun was so little used during the second part of the last great war.

The light infantry soldier carried his gun behind his back and he had a hand grenade in his hand. The reason for proceeding in this manner was that in close quarters the hand grenade had been put ahead of the gun and that the light infantry soldier could defend himself better against an attacker; he had not time to get his gun from behind his back in order to fire. It is quite different with a submachine gun or with a light machine gun where the bursts are only one-eighth of a second apart; one can thus, by the aid of successive bursts, stop an assailant.

Today, then, how can we be trained for close combat? How should we change armaments to have the advantage in this combat? This is what the author asks . . .

First of all, we must have in the combat group two light infantry soldiers with submachine guns; in the meantime, the author has shown that the German machine gun is completely antiquated; it is necessary to diminish the caliber, to reduce the weight of the projectile, to change the powder charge in order to diminish the excessive flight of the trajectory; it is necessary to find, also, a better way of transporting the arm. The right hand should remain free to use the grenade.

Close combat, in order to succeed on the defensive, has only a chance for success if, after he throws the hand grenades, he shifts to his rifle and gets in the habit of firing quickly.

The combat group finally will require thirteen men, a light machine gun, and three pistols; after the stopping effect of hand grenades, one can, if those concerned have received good instruction for close combat, count on a happy reaction, under the condition that the assailants have not too great a number.

In conclusion, the author states an underlying principle: "Fire, always fire! And leave aside the old duel with the sword. All fighting with bayonets, swords, or with bladed shovels lasts relatively too long and often is not decisive."

THE VEHICLE FOR WIRE-CUTTING.

[Le char de combat cisaillur.]

Under the title "Destruction of Wire Entanglements by Combat Vehicles," the "Deutsche Wehr" has recently called our attention to an article in the Polish Review "Przegląd Piechoty," which shows that they are interested in these subjects in Polish military circles.

The author brings out that in the last Great War, lines of wire entanglements were very extensive and that, in order to cut passages before attack, they fired thousands of shells without tangible results; small detachments, equipped with wire snips, had no more success. Neither did the employment of bridges, bundles of straw, and branches; only the combat vehicle has shown to be really practicable in the passage of wire entanglements.

The author believes that it would be necessary to bring about these destructions with vehicles preferably by night and that it would be indispensable to know the terrain beforehand, understanding that the motors would be equipped with mufflers and that they would establish a sufficient protection for the operation of other arms.

Here is a question, concludes the author, that hasn't made any progress since the last war and which seems should not be lost from sight.

September 1938

MODERN COMMAND.

[Le commandement moderne.] General Rouquier

This is the author's conception of command problems which will arise in event of a general European war. A study of historical examples clearly shows marked changes in means of communication. This progress has enlarged the scope of a commander's influence over his organization. In contrast to an officer's control over a few men close at hand before the advent of telephones, we have today real command exercised from a comfortable post far from the confusion of battle. The commander sees through the eyes of many subordinates. Rapid communication has thus enlarged his field of vision. Now with the airplane available to him for personal reconnaissance, it appears that our concept of command has assumed new proportions.

Command methods during the World War contributed much to success or failure. These are the last true examples the author can rely upon; for no engagements since then have been of sufficient size to show practical solutions under modern conditions.

OFFENSIVE COMBAT.

[Du combat offensif.] (I) Lieut.Colonel Montfort

REGARDING OUR ARTILLERY MATÉRIEL.

[A propos de nos matériels d'artillerie.] Lieut.Colonel Montmollin

This article gives an excellent account of the Swiss artillery in the reorganized division. The characteristics of artillery matériel is fully explained. In short, their foremost problem is not whether they will use guns or howitzers, whether they will seek portability or efficiency. It is how to get the proper proportion of guns to howitzers, how to get both portability and efficiency. Their terrain presents a unique problem for the appropriate organization of field artillery.

INFANTRY AND ITS ARMAMENTS.

[L'infanterie et son armement.]

A collector of latest news from Russia has published some notes on the subject of infantry and its armaments, drawn from real examples. War today consumes men and matériel with unprecedented rapidity, and this is particularly acute with the assailant, because only the offensive, from the point of view of attack and strategy, exhausts itself in developing, by reason of its frightful moral and material tension. We must have complete and uninterrupted supply of men, arms and ammunition; otherwise, the attack stops prematurely and is changed to a vain effort without results and costing dearly. The War in Spain, just as in the Orient, is a daily example of this.

Generalizations are always dangerous; time for definite conclusions has not yet arrived. Local peculiarities of the conflict do not repeat themselves. All the time certain observations are so undisputable that military science has already noted the departure of certain points in the art of war in the future.

What changes will be made in guns in warfare, what great things can be done in the progress of military technique? Men remain the same, as before, the decisive element in battle. Infantry remains the center of gravity of the arms and all the others must adapt themselves to its action.

Nearly all observers of military operations in Spain and the Orient are in accord on this subject. Conditions of infantry action are constantly

changing. The quality level (attained by education, instruction, and armament of the soldier) requires continuous attention and alteration. By advice of military authorities, infantry requires now, "The presence of a noncommissioned officer, a corporal, or a specialist engaged in each group of three men." It is only in the presence of a human frame built up of brave combatants, enterprising and well instructed, that it is possible to build up units capable of holding and advancing under actual conditions, particularly difficult in the attack.

Experience in the Spanish War brings serious changes in the infantry armament. Conclusions of foreign observers are as follows:

(1) The rifle has become obsolete, superseded by the submachine gun. In the Insurgent army, the very popular arm is the nine millimeter German Schneisser submachine gun, with its thirty cartridges. It is a simple arm, solid and sure. It is well that it is not entirely free of faults.

(2) The soldier furnished with an automatic fire arm and a hand grenade will always be the decisive element in combat. Both combatants in Spain are successfully employing groups of three men on foot, following the example of the Gran Chaco War.

(3) Infantry has need of being equipped with an abundance of hand grenades that surely function. The grenades used by the Insurgents are more dangerous to themselves than to the enemy.

(4) Portable machine guns have definitely shown their uselessness. On the contrary, machine guns on fixed rests are indisputably the fundamental arm in the infantry zone of action.

(5) Bomb throwers are necessary in attack and the greater their caliber the greater their usefulness in combat. The same is true of mine throwers and flame throwers where profitable action cannot always be accomplished by the artillery.

(6) Infantry should always place in position some antitank artillery, machine guns on fixed rests, firing armor-piercing bullets, and small rapid fire guns. The 37-mm and 20-mm German guns have shown themselves to be excellent; on the contrary, the 65-mm guns have shown up unsuitable.

(7) The antitank guns should be mobile and have an unlimited supply of projectiles.

Italian military observers advise us that it is through the absence of many of these conditions that we attribute the failures of Franco, and in case of victories their losses have been out of proportion to their success.

GERMAN OPINIONS: ORGANIZATION OF ARMY CAVALRY.

[Opinions allemandes: organisation de la cavalerie d'armée.]

This is a summary of the author's opinions regarding the use of horse and mechanized units. Light and rapid mechanized divisions should be employed on terrain suited to motor travel. On much terrain, the horse will be far superior. We must reject the use of divisions, with mixed horse brigades and mechanized brigades. They will have to operate apart from one another due to differences in speed and other characteristics. Upon entering action unity of action would be thus destroyed.

The author's conception of a modern cavalry corps is somewhat as follows:

It should be composed of principal arms and auxiliary arms.

The former include the cavalry, the cyclists, and the artillery.

The auxiliary arms are the pioneers, the antitank units and the signal services.

The cavalry should contain some motorized equipment in the squadrons; throughout the regiments there would be some light detachments of motorized pioneers for antitank defense and some motorized antitank guns; these, more rapid than the troops they serve; in addition, some counterreconnaissance cars.

The light columns and the trains would be horse-drawn.

The article continues with equipment recommended for the cyclists, the artillery, the pioneers and the communications service.

October 1938

OFFENSIVE COMBAT.

[Du combat offensif.] (II) Lieut.Colonel Montfort

THE EXERCISE OF COMMAND IN TIME OF PEACE.

[L'exercice du commandement en temps de paix.] Lieut.Colonel Mayer

Evidently, the principal need of a military commander is to prepare his troops for war and bring out in them their maximum combat value. The strength of an army is made up of several different elements. We are tempted to say that one is more essential than the others. Discipline is traditionally considered the most important, but this is not necessarily true.

The author continues with examples of forced discipline founded upon the principle of immediate and absolute obedience, which is a rather exterior mark of respect. In contrast to this apparent discipline is the genuine which is based on confidence, affection, esteem, and respect. It is this and this alone which, without exaggeration, makes up the principal force of any army. Closely connected with this genuine discipline is the moral and mental attitude. The "esprit de corps" of the troops is really the outcome of all the attributes and upon the acquiring of all these desirable qualities rests the control of troops through their commanders. The proper time to lay a firm foundation is in time of peace.

ROYAL AIR FORCE QUARTERLY (Great Britain)

January 1939

THE TREND OF AIR POWER. By E.L. H-W

DICTATORSHIP IN ENGLAND: SOME ASPECTS OF SIMILARITY BETWEEN CROMWELL AND MODERN DICTATORS. Flight-Lieutenant Butler

A GREAT FAILURE. THE AUSTRIAN OFFENSIVE OF 1916 IN THE TREN-
TINO. Major Woodall

ROUGERON'S "AVIATION DE BOMBARDEMENT." Part II
REFLECTIONS ON CHINA. Squadron-Leader Bartholomew

ROYAL ENGINEERS JOURNAL (Great Britain)

December 1938

CAMOUFLAGE IN NATURE AND IN WAR. Dr. Cott
THE MILITARY ENGINEER IN MODERN WARFARE. Major General Bond

ROYAL TANK CORPS JOURNAL (Great Britain)

January 1939

THE BATTLE OF CAMBRAI
TWO HUNDRED YEARS OF EUROPE
STRATEGY
MECHANISED WARFARE
RUSSIAN REFLECTIONS ON THE GERMAN ARMY
TANKS IN THE NEXT WAR

SIGNAL CORPS BULLETIN

October to December 1938

SIGNALS, UNITED STATES ARMY TROOPS IN CHINA. Technical Sergeant
Sheldon

SOME SIDELIGHTS ON THE LANGUAGE DETAIL TO JAPAN. Captain Sherr

UNITED SERVICES REVIEW (Great Britain)

10 November 1938

EFFECT OF NAZI ACTIVITIES. MARSHALLING OF THE WORLD'S HOSTS
FOR WAR. Air Commodore Charlton

24 November 1938

ITALIAN DIPLOMACY. Air Commodore Charlton
AMERICAN EYES ON EUROPE. Lieut.Colonel Macnamara

1 December 1938

GAS DEFENCE IN HOLLAND
THE NEW GERMAN NAVY. FROM MINIATURE CRAFT TO FULL-SIZED WAR-
SHIPS. Blackman

THE RACE FOR AIR ARMAMENT. Air Commodore Charlton

8 December 1938

WHAT COMPULSORY SERVICE MEANS. WE DO NOT REQUIRE CONSCRIPTION
IN ANY FORM. Air Commodore Charlton
HELIGOLAND AND THE GERMAN COLONIES. Schauorth

15 December 1938

FRANCE AND OUR EXPEDITIONARY FORCE. Air Commodore Charlton
THE BRAZILIAN NAVY. Blackman
RUTHENIA: HIGH ROAD BETWEEN GERMANY AND ROUMANIA. Lieut.-
Colonel Macnamara

22 December 1938

WILL THERE BE AN AIR PACT? Air Commodore Charlton

29 December 1938

COMPARING THE AIR STRENGTH OF FRANCE AND GERMANY. Air Com-
modore Charlton
THE MANDATED TERRITORIES AGAIN. Lieut-Colonel Macnamara

5 January 1939

COPENHAGEN GUNS. — 1 Manning

12 January 1939

LOOKING BACK AT 1938. Lieut.Colonel Macnamara
COPENHAGEN GUNS. — 2 Manning
DUTIES AND STATUS OF THE AIR OBSERVER. WHEEL HAS COME FULL
CIRCLE. Air Commodore Charlton

19 January 1939

FIGHTER VERSUS BOMBER. Air Commodore Charlton

26 January 1939

AUSTRALIA'S DEFENCES. Lieut.Colonel Macnamara
WHAT A FRANCO VICTORY WOULD MEAN. Air Commodore Charlton

2 February 1939

AMERICA PREPARES AN EVER-READY DEFENCE. Air Commodore Charlton
THE NEW AMERICAN SERVICE RIFLE. WEAPON OF VERY GREAT VALUE

9 February 1939

STRATEGIC ISLANDS ON OUR SEA ROUTES. Air Commodore Charlton

VETERINARY BULLETIN

(Supplement to "The Army Medical Bulletin")

January 1939

THE REMOUNT SERVICE. Colonel Johnson
ANIMAL MANAGEMENT AT A REMOUNT DEPOT. Lieut.Colonel Ewen and
Lieut.Colonel Sager

WEHRTECHNISCHE MONATSFESTE (Germany)

BY LIEUTENANT F. HENRIKSEN, Infantry-Reserve

July 1938

NEW NATIONAL DEFENSE ECONOMICAL ORIENTATIONS ABROAD.
[Neue wehrwirtschaftliche Erörterungen im Auslande.] Dr. Frie-
densburg

The author compares and discusses recent writers' trends in Austria,
Switzerland, the Scandinavian countries, France, Czechoslovakia, Great
Britain, and the United States. German astonishment is expressed at the
frankness with which American and British writers treat the subject.

The articles deal primarily with the danger to stored food supplies
from aerial attacks, although their effectiveness is deemed less by the
authors after the experiences in Spain and China than it was a few years
ago. It is recommended that storehouses be scattered throughout the
hinterland away from all landmarks such as railroads and watercourses.

The greatest amount of discussion is given to liquid fuels because of
the motorization of the armies, the enlarging of the air forces, and the
change of naval vessels for the burning of liquid fuel, and the use of fuel
oil in ever greater quantities as the speed of warships increases. Germany
has set the example of independence from countries producing the natural
crude oil through hydrogenation and synthesis plants. On the other hand,
England and France decline this method, feeling sure that they and their
allies will be able to keep the sealanes open.

As Italy and Japan have no sufficient coal deposits they claim to be
able to furnish sufficient substitutes from alcohol. Only to keep abreast of
technical developments and to have an additional source in transient
emergencies did England and France build hydrogenation and synthesis
plants of modest output. The technical writers of the smaller powers, Bel-
gium, Holland, Sweden, Poland, and Czechoslovakia, favor the installation
of hydrogenation plants, except as to costs.

Next to the questions on raw materials are those on industrial mobiliza-
tion. It is always surprising to read how in countries having a peace economy
such as England and the United States this phase of war preparation is
brought to the fore. In the United States it is boasted that not only are all
industrial orders in time of war fully prepared but that every detail has
been accurately worked out. What measures Germany has taken can not be
gathered from foreign periodicals. Italy and Japan have been more
open in this regard through legislation, and a "total" defense economy
seems to have been realized.

The system of the German national motor highways (Reichsautobahnen)
seems worthy of imitation to most French and English writers. There are
those, however, who point out the vulnerability of such a system to aerial
attacks because of their easy recognition, and prefer to that the use of the
existing road systems.

The problem of financial war preparation was regarded as the kernel
of defense economy until 1914, and at that time actually received consider-
ation only. This is now almost generally neglected and sometimes even
regarded as immaterial, inasmuch as the modern states will almost without
exception exert dictatorial powers over their citizens in case of war. They
feel that they are less dependent upon their citizens' good will, although
the maintenance of indispensable imports may bring grave financial prob-
lems. English writers urge the export of gold and currency even after the
commencement of hostilities that purchasing power may be maintained.
The French view is that no war was ever decided by financial superiority
of one side over the other. During the World War both opponents could
have kept on fighting for years had it been a question of finances.

All are agreed in warning against large scale financing through loans
and suggested ruthless taxation of war earnings.

In the Far East, Japan's war economical legislation and enforcement
thereof is closely observed, because here, for the first time since 1918, one
of the great powers is faced with serious problems of war economy and
approaches closer the principles of "total" warfare.

IMPORTANT MINERAL RESOURCES OF THE NEIGHBORS OF GREATER GERMANY.

[Der kriegswichtige bergbauliche Rohstoffbesitz der Nachbarn
Grossdeutschlands.] Dr. Ruprecht

A general survey of the mineral resources of Germany's neighbors
which are of importance to war industries.

FIELD GUN AND LIGHT FIELD HOWITZER. (A valuation.) [Feldkanone und leichte Feldhaubitze. (Eine Wertberechnung.)]

Lieut.General Marx, Retired

From his own experience on the Western Front (1914-1916) the author
weighs the comparative advantages and disadvantages of the two weapons.
Of interest chiefly to artillery technicians.

FROM "BOMB CANNON" TO INFANTRY CANNON.

[Von der "Bombenkanone" zum Infanteriegeschütz.] Captain Westphal

An historical survey of the evolution and development from the early minenwerfer of the Russo-Japanese War to minenwerfer, trench mortar and antitank gun of today.

WIRELESS METHODS FOR AERIAL AND MARINE NAVIGATION.

[Drahtlose Verfahren zur Navigation in See- und Luftfahrt.] Colonel von Dufais, Retired

A purely technical dissertation on the subject.

THE DIESEL AIRPLANE ENGINE AND ITS FUTURE IMPORTANCE TO MILITARY AVIATION.

[Der Dieselflugmotor und seine zukünftige Bedeutung für die Militärluftfahrt.] By Wowa

This article is particularly devoted to the twin crankshaft (two pistons) per cylinder Diesel engine with which the German Air Force is at present experimenting.

The earliest experiments of this nature are those of Professor Junkers which date back to 1892. In 1929 the first test flight cross-country was made from Dessau to Cologne. The present Jumo 205 is claimed to be equal to gasoline motors. The Jumo 205 rates as follows: weight 530 kg., 700 horsepower at 2,400 revolutions per minute.

Decisive for the introduction of the Diesel engine to civil aviation were the factors of economy and fire safety. For military aviation performance is the decisive factor. This factor is met by smaller fuel consumption which increases the load capacity.

In the case of the bombing plane, pay load and cruising range are interdependent. The amount of fuel load determines the cruising range. The trimotored Ju 52 equipped with gasoline engines uses approximately 320 kg. of fuel per flight hour, which the Ju 52 equipped with Diesel engines of similar performance needs only 200 kg. of fuel per hour. On short flights gasoline motors have the advantage because of the trivial saving in fuel load and the increased weight per horsepower of the Diesel engine. The Diesel's installation in observation ships and long range bombers would make possible the full utilization of all its advantages.

The Dornier amphibians, Aeolus and Zephyr, covered together a total of 3,300 kilometers across the North Atlantic in approximately 170 hours. Prior to the Atlantic flights careful tests were made on the Baltic Sea.

Similar performances across the South Atlantic are cited.

The Junkers fuel pump operates with not less than 550 at pressure and has to inject the entire fuel supply within 1/1000 second. The pumps need be overhauled only every 600 to 800 hours.

The author goes on to point out the advantages of amphibians for colonial protection, citing Spain and the Netherlands as users of the Dornier amphibian in their overseas possessions.

The author further mentions the use of the "parachute arm" in connection with long range Diesel-powered airplanes. He paints the picture of an airplane gliding from a high altitude to drop off two well-equipped men by parachute near oil fields or industrial plants and starting large scale conflagration through arson. Thus the war of the future is envisaged as covering continents instead of countries.



U.S.A. Signal Corps

Readers' Guide and Subject Index

A

Aerial Warfare
Air Arm
Ammunition
Animals
Antiaircraft Artillery
Antiaircraft Defense
Antigas
Antitank
Applicatory Exercises
Armaments
Armies (See country)
Command and Staff
Mobilization
Organization and Equipment
Training
Armored Cars
Art of War
Artillery (Other Arms, similarly)
Command and Staff
Organization and Equipment
Training Tactics
Attack

B

Breakthrough Operations

C

Camouflage
Cavalry
Chemical Warfare Service
Civilian Conservation Corps
Coast Artillery
Command, Staff, and Logistics
Counterattack

D

Defiles
Delaying Action
Disarmament

E

Engineers
Envelopment
Equitation

F

Fire Superiority
Flank Operations
Formations, Battle
Fortifications
France (Army of)
Future Warfare

G

Gas and Smoke (Use of)
Geography (Military)

Germany (Army of)
Great Britain (Army of)

H

History (General)

I

Infantry
Intelligence (Military)
International Relations
Italy (Army of)

J

Japan (Army of)
Joint Operations

K

L

Large Units, Organization and Tactical Functions (Army, Corps and Division)
Law, Military and International
Leadership
Liaison

M

Machine Guns
Maneuvers
Map Problems
Marches
Marine Corps
Mechanization
Medical Service
Meeting Engagement
Mining
Mobile Warfare
Mobility
Mobilization
Motorization

N

National Defense
Naval Warfare
Navies (See country)
Night Operations

O

Obstacles
Ordnance Service
Organization
Overseas Expeditions

P

Penetration
Position Warfare
Principles of War
Pursuit

Q

Quartermaster Service

R

Raid
Reconnaissance
Riots
River Crossings
Routes Communications

S

Security
Signal Service
Supply

T

Tactics Operations
Evolution of Tactics
General Topics
Defensive Combat
Offensive Combat
Special Warfare
Troop Movements
Tanks
Technology
Terrain
Topography Surveying
Transportation
Turning Movements

U

United States (Army of)

V

Veterinary Service

W

War Peace
Wars (Ancient, Medieval, Modern)
World War
C — Socio-Economic History
E — General Military History
F — Zone of Interior
G — Arms and Services
H — Military Conduct of the War in the Field
J — Campaigns and Battles
L — Naval History
Weapons
Withdrawal

X

Y

Z

LIST OF PERIODICALS INDEXED

AND

KEY TO ABBREVIATIONS

A Med Bul = Army Medical Bulletin
A Ord = Army Ordnance
A Quar = Army Quarterly (Great Britain)
Bul Belge Mil = Bulletin Belge des Sciences Militaires (Belgium)
Can Def Quar = Canadian Defence Quarterly (Canada)
Cav Jour = Cavalry Journal
Chem War Bul = Chemical Warfare Bulletin
CA Jour = Coast Artillery Journal
FA Jour = Field Artillery Journal
Ftg Forc = Fighting Forces (Great Britain)
La France Mil = La France Militaire (France)
Inf Jour = Infantry Journal
Jour RAMC = Journal of the Royal Army Medical Corps (Great Britain)
Jour R Art = Journal of the Royal Artillery (Great Britain)
Jour RUSI = Journal of the Royal United Service Institution (Great Britain)

Jour USII = Journal of the United Service Institution of India (Great Britain — India)
Kraft = Kraftfahrkampftruppe (Germany)
Kras = Krasnaya Zvezda (Russia)
MC Gaz = Marine Corps Gazette
Mil Mitt = Militärwissenschaftliche Mitteilungen (Austria)
Mil-Woch = Militär-Wochenblatt (Germany)
Mil Eng = Military Engineer
Mil Surg = Military Surgeon
Nav Inst Proc = Naval Institute Proceedings
Plon = Pionere (Germany)
QM Rev = Quartermaster Review
Ras Cul Mil = Rassegna di Cultura Militare (Italy)
Res Off = Reserve Officer
Rv l'Air = Revue de l'Armée de l'Air (France)
Rv de Cav = Revue de Cavalerie (France)
Rv d'Inf = Revue d'Infanterie (France)

Rv Mil Gen = Revue Militaire Générale (France)
Rv Mil Sulsse = Revue Militaire Suisse (Switzerland)
RAF Quar = Royal Air Force Quarterly (Great Britain)
Roy Eng Jour = Royal Engineers Journal (Great Britain)
RTC Jour = Royal Tank Corps Journal (Great Britain)
SC Bul = Signal Corps Bulletin
US Rev = United Services Review (Great Britain)
Vet Bul = Veterinary Bulletin
Wehr Monat = Wehrtechnische Monatshefte (Germany)

Jan = January
Feb = February
Mar = March
Apr = April
May = May
Jun = June

Jul = July
Aug = August
Sep = September
Oct = October
Nov = November
Dec = December

A

AERIAL WARFARE

Aerial bombardments in Spain. (La France Mil — 1 Sep 1938)
 Antiaircraft defense in the zone of the interior. (Mil-Mitt — Jul 1938)
 Impressions as to the functions of an air force during the pursuit of retreating ground troops. (Mil-Woch — 20 May 1938)
 The importance of the interior front in the war of the future. (Ras Cul Mil — Jul-Aug 1938)
 Air power as a strategic arm. (Rv l'Air — Aug 1938)
 Fields of fire. (Rv l'Air — Aug 1938)
 The employment of supporting arms in the Spanish Civil War. [See "Original Military Study"]
 Japanese bombardment aviation. [See "Foreign Military Digests"]
 Tactics and technique of the air forces in the Spanish Civil War. [See "Foreign Military Digests"]
 Blackout. (Inf Jour — Jan-Feb 1939)
 Antiaircraft protection for our naval bases. (MC Gaz — Nov 1938)
 Adaptability of the parachute to military uses. (Res Off — Dec 1938)
 The trend of air power. (RAF Quar — Jan 1939)
 Rougeron's "Aviation de Bombardement." (RAF Quar — Jan 1939)
 The race for air armament. (US Rev — 1 Dec 1938)
 Will there be an air pact? (US Rev — 22 Dec 1938)
 Fighter versus bomber. (US Rev — 19 Jan 1939)

AIR ARM

Organization and Equipment

The beginning of the Belgian Air Force. (Bul Belge Mil — Jul, Aug 1938)
 The autogiro. (Bul Belge Mil — Sep 1938)
 Field airdromes. (Kras — 22 Oct 1938)
 Czechoslovakia and its aircraft industry. (Mil-Woch — 3 Jun 1938)
 Transportation and landing of an aerial infantry unit. (Rv d'Inf — Jul 1938)
 What can one expect from modern antiaircraft artillery. (Rv Mil Gen — Aug 1938)
 The Diesel airplane engine and its future importance to military aviation. (Wehr Monat — Jul 1938)
 Tactics and technique of the air forces in the Spanish Civil War. [See "Foreign Military Digests"]
 A national defence programme for the United States. (Can Def Quar — Jan 1939)
 Adaptability of the parachute to military uses. (Res Off — Dec 1938)
 Experimental development of the airplane and its accessories. (Res Off — Feb 1939)
 Rougeron's "Aviation de Bombardement." (RAF Quar — Jan 1939)
 The race for air armament. (US Rev — 1 Dec 1938)
 Will there be an air pact? (US Rev — 22 Dec 1938)
 Comparing the air strength of France and Germany. (US Rev — 29 Dec 1938)
 Duties and status of the air observer. (US Rev — 12 Jan 1939)
 Fighter versus bomber. (US Rev — 19 Jan 1939)

Training Tactics

Aerial bombardments in Spain. (La France Mil — 1 Sep 1938)
 The pursuit plane at high altitudes. (Kras — 18 Aug 1938)
 Aviation on the battlefield. (Kras — 21 Aug 1938)
 Principles of present day offensive combat. (Kras — 21 Oct 1938)
 Impressions as to the functions of an air force during the pursuit of retreating ground troops. (Mil-Woch — 20 May 1938)
 Air power as a strategic arm. (Rv l'Air — Aug 1938)
 Fields of fire. (Rv l'Air — Aug 1938)
 First trial of debarking from and boarding an autogiro in flight. (Rv l'Air — Aug 1938)
 Transportation and landing of an aerial infantry unit. (Rv d'Inf — Jul 1938)
 The employment of supporting arms in the Spanish Civil War. [See "Original Military Study"]
 Japanese bombardment aviation. [See "Foreign Military Digests"]
 Tactics and technique of the air forces in the Spanish Civil War. [See "Foreign Military Digests"]
 Joint AA-Air Corps exercises. (CA Jour — Nov-Dec 1938)
 Commencing a modern war. (FA Jour — Jan-Feb 1939)
 Blackout. (Inf Jour — Jan-Feb 1939)
 The trend of air power. (RAF Quar — Jan 1939)
 Rougeron's "Aviation de Bombardement." (RAF Quar — Jan 1939)
 The military engineer in modern warfare. (Roy Eng Jour — Dec 1938)
 Duties and status of the air observer. (US Rev — 12 Jan 1939)
 Fighter versus bomber. (US Rev — 19 Jan 1939)

AIR POWER

The trend of air power. (RAF Quar — Jan 1939)

AMMUNITION

Small-arms ammunition. (A Ord — Jan-Feb 1939)
 What can we expect of rockets? (A Ord — Jan-Feb 1939)

ANIMALS

Horse raising in Europe. (Rv de Cav — Sep-Oct 1938)

ANTIAIRCRAFT ARTILLERY

Aviation on the battlefield. (Kras — 21 Aug 1938)
 Antiaircraft defense in the zone of the interior. (Mil Mitt — Jul 1938)
 Antiaircraft defense by a rifle company. (Mil-Woch — 24 Jun 1938)
 Location of airplanes by sound ranging. (Ras Cul Mil — Sep 1938)

What can one expect from modern antiaircraft artillery. (Rv Mil Gen — Aug 1938)
 The employment of supporting arms in the Spanish Civil War. [See "Original Military Study"]
 Joint AA-Air Corps exercises. (CA Jour — Nov-Dec 1938)
 The backbone of sea power. (CA Jour — Jan-Feb 1939)
 Blackout. (Inf Jour — Jan-Feb 1939)
 Antiaircraft protection for our naval bases. (MC Gaz — Nov 1938)

ANTIAIRCRAFT DEFENSE

Aviation on the battlefield. (Kras — 21 Aug 1938)
 Antiaircraft defense in the zone of the interior. (Mil Mitt — Jul 1938)
 Antiaircraft defense by a rifle company. (Mil-Woch — 24 Jun 1938)
 Location of airplanes by sound ranging. (Ras Cul Mil — Sep 1938)
 Fields of fire. (Rv l'Air — Aug 1938)
 What can one expect from modern antiaircraft artillery. (Rv Mil Gen — Aug 1938)
 The employment of supporting arms in the Spanish Civil War. [See "Original Military Study"]
 Tactics and technique of the air forces in the Spanish Civil War. [See "Foreign Military Digests"]
 Joint AA-Air Corps exercises. (CA Jour — Nov-Dec 1938)
 Blackout. (Inf Jour — Jan-Feb 1939)
 Antiaircraft protection for our naval bases. (MC Gaz — Nov 1938)

ANTITANK

Determination of barrage casualty coefficients. (Bul Belge Mil — Jul 1938)
 Antitank defense in the Spanish War. (La France Mil — 1 Sep 1938)
 Tanks — armored reconnaissance cars and the defense against these. (Kraft — Sep 1938)
 Tanks against tanks. (Kras — 26 Aug 1938)
 An engineer's ideas concerning antitank defense. (Mil-Woch — 20 May 1938)
 Defense against armored vehicles. (Mil-Woch — 3 Jun 1938)
 The employment of supporting arms in the Spanish Civil War. [See "Original Military Study"]
 French principles for the employment of mechanized and motorized units and the defense against these. [See "Foreign Military Digests"]
 Russian principles for the employment of tank and motorized units and the defense against these. [See "Foreign Military Digests"]
 Fields of fire. (Rv l'Air — Aug 1938)
 Reflections on armament problems. (Rv Mil Gen — Jul 1938)
 Infantry and its armaments. (Rv Mil Suisse — Sep 1938)
 The race for air armament. (US Rev — 1 Dec 1938)

ART OF WAR STRATEGY

New instructions for hand-to-hand fighting. (Kras — 24 Sep 1938)
 Supply problems occurring in open warfare. (Mil-Woch — 3 Jun 1938)
 Joint action of the combat arms: Artillery reconnaissance. (Mil-Woch — 17, 24 June 1938)
 The importance of the interior front in the war of the future. (Ras Cul Mil — Jul-Aug 1938)
 He who shuts himself up is lost. (Ras Cul Mil — Jul-Aug 1938)
 Infantry in the Spanish War. (Rv Mil Gen — Sep 1938)
 German opinions: Close combat. (Rv Mil Suisse — Aug 1938)
 Modern command. (Rv Mil Suisse — Sep 1938)
 The employment of supporting arms in the Spanish Civil War. [See "Original Military Study"]
 Infantry in the breakthrough. [See "Foreign Military Digests"]
 The inner nature of war. (A Quar — Jan 1939)
 What price assault without support. (Can Def Quar — Jan 1939)
 Commencing a modern war. (FA Jour — Jan-Feb 1939)
 Maritime or continental? (Ftg Fore — Dec 1938)
 Limited liability war. (Ftg Fore — Feb 1939)
 Leader and led. (Inf Jour — Jan-Feb 1939)
 The chemist's role in national defence. (Jour RUSI — Nov 1938)
 The military engineer in modern warfare. (Jour RUSI — Nov 1938)
 "Discuss the dictum that the size of modern armies has rendered strategy wholly subordinate to tactics." (Jour USII — Oct 1938)
 Antiaircraft protection for our naval bases. (MC Gaz — Nov 1938)
 Campaign of the Ten Thousand. (Mil Eng — Jan-Feb 1939)
 Offensive defensive balance in history. (Res Off — Jan 1939)
 The military engineer in modern warfare. (Roy Eng Jour — Dec 1938)
 Strategy. (RTC Jour — Jan 1939)
 Mechanized warfare. (RTC Jour — Jan 1939)
 Tanks in the next war. (RTC Jour — Jan 1939)

ARTILLERY

Organization and Equipment

Belgian artillery and motorization. (Bul Belge Mil — Aug 1938)
 Regarding our artillery matériel. (Rv Mil Suisse — Sep 1938)
 Field gun and light field howitzer. (Wehr Monat — Jul 1938)
 What can we expect of rockets? (A Ord — Jan-Feb 1939)
 The German artillery in combat. (FA Jour — Jan-Feb 1939)

Training Tactics

Night action of artillery. (Kras — 30 Sep 1938)
 The hand grenade in combat. (Kras — 4 Oct 1938)
 Principles of present day offensive combat. (Kras — 21 Oct 1938)
 Artillery in a meeting engagement. (Mil-Woch — 20 May 1938)
 Joint action of the combat arms: Artillery reconnaissance. (Mil-Woch — 17, 24 June 1938)
 Lessons of the Spanish War. [See "Foreign Military Digests"]
 Infantry in the breakthrough. [See "Foreign Military Digests"]
 French principles for the employment of mechanized and motorized units and the defence against these. [See "Foreign Military Digests"]

Russian principles for the employment of tank and motorized units and the defense against these. [See "Foreign Military Digests"]
 The German artillery in combat. (FA Jour — Jan-Feb 1939)
 Commencing a modern war. (FA Jour — Jan-Feb 1939)

ATTACK

Principles of present day offensive combat. (Kras — 21 Oct 1938)
 Fields of fire. (Rv l'Air — Aug 1938)
 Offensive combat. (Rv Mil Suisse — Sep, Oct 1938)
 The preparation of tank attacks. [See "Foreign Military Digests"]
 Tanks in the attack: French and German tactical theories. (Jour RUSI — Nov 1938)

AUSTRALIA (ARMY OF)

Australia's defences. (US Rev — 26 Jan 1939)

AUSTRIA (ARMY OF)

The occupation of Bosnia and Herzegovina in 1878. (Mil Mitt — Aug 1938)
 The bombardment of the railway viaduct at Sablici (Italian front, east of Monfalcone) 9 January 1916. (Mil Mitt — Aug 1938)
 The development of the Austrian army up to March 1938. (Mil-Woch — 20 May 1938)

AUTOGIRO

The autogiro. (Bul Belge Mil — Sep 1938)
 First trial of debarking from and boarding an autogiro in flight. (Rv l'Air — Aug 1938)

B

BELGIUM (ARMY OF)

The beginning of the Belgian Air Force. (Bul Belge Mil — Jul, Aug 1938)
 Belgian artillery and motorization. (Bul Belge Mil — Aug 1938)
 The first of my two missions in Russia during the World War. (Bul Belge Mil — Sep 1938)
 The 2d and 5th Regiments of dismounted Chasseurs in their sortie from Antwerp 25 and 26 August 1914. (Bul Belge Mil — Sep 1938)

BRAZIL (NAVY OF)

The Brazilian Navy. (US Rev — 15 Dec 1938)

BREAKTHROUGH OPERATIONS

Principles of present day offensive combat. (Kras — 21 Oct 1938)
 Infantry in the breakthrough. [See "Foreign Military Digests"]

C

CAMOUFLAGE

Camouflage in nature and in war. (Roy Eng Jour — Dec 1938)

CASUALTIES

Evacuation of casualties in time of war. (Mil Surg — Dec 1938)

CAVALRY

Organization and Equipment

German opinions: Organization of army cavalry. (Rv Mil Suisse — Sep 1938)
 Mechanized cavalry has come to stay. (Cav Jour — Nov-Dec 1938)
 What of the future? (Cav Jour — Jan-Feb 1939)

Training Tactics

Attack by highly mobile troops against the enemy flank and defense against same. (Mil-Woch — 24 Jun 1938)
 Cavalrymen of 1805. (Rv de Cav — Sep-Oct 1938)
 A raid into the Vosges and Alsace. (Rv de Cav — Sep-Oct 1938)
 Mounted across the masses of Aures. (Rv de Cav — Sep-Oct 1938)
 The employment of supporting arms in the Spanish Civil War. [See "Original Military Study"]
 What of the future? (Cav Jour — Jan-Feb 1939)
 What does Palestine prove? (Cav Jour — Jan-Feb 1939)
 Cavalry operations in Spain. (Cav Jour — Jan-Feb 1939)
 What might have happened. (Ftg Fore — Dec 1938)

CHEMICAL SERVICE

The employment of supporting arms in the Spanish Civil War. [See "Original Military Study"]
 Engineer in chemical warfare. (Chem War Bul — Jan 1939)
 Combat gases and the German doctrine. (Chem War Bul — Jan 1939)
 The chemist's role in national defence. (Jour RUSI — Nov 1938)
 A practical and brief program for the teaching of chemical warfare to a Medical Reserve Officers' Troop School. (Mil Surg — Jan 1939)
 The military engineer in modern warfare. (Roy Eng Jour — Dec 1938)
 Gas defence in Holland. (US Rev — 1 Dec 1938)

CHINA (ARMY OF)

North China, 1937. (MC Gaz — Nov 1938)
 Between wars in the Far East. (Nav Inst Proc — Jan 1939)
 Reflections on China. (RAF Quar — Jan 1939)

CIVILIAN CONSERVATION CORPS

Causes of death: U.S. Army compared with the C.C.C. (A Med Bul — Oct 1938)

COAST ARTILLERY

The backbone of sea power. (CA Jour — Jan-Feb 1939)
The navy and the coast artillery. (CA Jour — Jan-Feb 1939)

COAST DEFENSE

The backbone of sea power. (CA Jour — Jan-Feb 1939)
The navy and the coast artillery. (CA Jour — Jan-Feb 1939)

COMMAND, STAFF, AND LOGISTICS

The Russian army without leaders. (La France Mil — 28 Aug 1938)
Command and Commissars in the Red Army. (La France Mil — 16 Sep 1938)
The command post of a commander of a force of all arms. (Kras — 20 Oct 1938)
Supply problems occurring in open warfare. (Mil-Woch — 3 Jun 1938)
The training of officer replacements. (Mil-Woch — 24 Jun 1938)
Ludendorff. (Ras Cul Mil — Sep 1938)
General Krennkampf and the Battle of Tannenberg. (Rv Mil Gen — Jul 1938)
Modern command. (Rv Mil Suisse — Sep 1938)
The exercise of command in time of peace. (Rv Mil Suisse — Oct 1938)
French principles for the employment of mechanized and motorized units and the defense against these. [See "Foreign Military Digests"]
Russian principles for the employment of tank and motorized units and the defense against these. [See "Foreign Military Digests"]
Arms for the army. (A Ord — Jan-Feb 1939)
Policy and command in the American Civil War, 1864-1865. (A Quar — Jan 1939)
A national defense programme for the United States. (Can Def Quar — Jan 1939)
Oil supplies in time of war. (Can Def Quar — Jan 1939)
Fitting the means to the ends. (FA Jour — Nov-Dec 1938)
Limited liability war. (Ftg Forc — Feb 1939)
Leader and led. (Inf Jour — Jan-Feb 1939)
Some qualifications for leadership and command. (MC Gaz — Nov 1938)
Evacuation of casualties in time of war. (Mil Surg — Dec 1938)

COUNTERATTACK

Historical example in troop leading: A counterattack. (Mil-Woch — 24 Jun 1938)
Russian principles for the employment of tank and motorized units and the defense against these. [See "Foreign Military Digests"]

CZECHOSLOVAKIA (ARMY OF)

Tanks — armored reconnaissance cars and the defense against these. (Kraft — Sep 1938)
The Czechoslovakian army. (Mil-Woch — 27 May 1938)
Czechoslovakia and its aircraft industry. (Mil-Woch — 3 Jun 1938)
An observer in Czechoslovakia during the crisis. (Ftg Forc — Dec 1938)
What might have happened. (Ftg Forc — Dec 1938)
Ruthenia: high road between Germany and Roumania. (US Rev — 15 Dec 1938)

D**DEMOLITIONS**

The platoon demolition equipment. (Mil Eng — Jan-Feb 1939)

DICTATORSHIP

Dictatorship in England: Some aspects of similarity between Cromwell and modern dictators. (RAF Quar — Jan 1939)

DISCIPLINE

Discipline, its responsibility and problems. (Mil-Woch — 20 May 1938)
The exercise of command in time of peace. (Rv Mil Suisse — Oct 1938)

E**ECONOMICS**

New national defense economical orientations abroad. (Wehr Monat — Jul 1938)

ENGINEERS

Employment of engineer troops in Spain. (La France Mil — 7 & 8 Aug 1938)
Technical services in war. (Mil Mitt — Sep 1938)
An engineer's ideas concerning antitank defense. (Mil-Woch — 20 May 1938)
Scharnhorst, Chief of the Engineer Corps 1810-1813. (Pion — Aug 1938)
History of the Saxon Engineer Corps. (Pion — Aug 1938)
125 years ago: Engineers and fortresses during the Napoleonic era. (Pion — Aug 1938)
Unwanted fortresses. (Pion — Aug 1938)
Historical examples of battles for rivers. (Pion — Aug 1938)
The employment of supporting arms in the Spanish Civil War. [See "Original Military Study"]
Infantry in the breakthrough. [See "Foreign Military Digests"]
The Hindenburg Line. (A Quar — Jan 1939)
Engineers in chemical warfare. (Chem War Bul — Jan 1939)
The military engineer in modern warfare. (Jour RUSI — Nov 1938)
The platoon demolition equipment. (Mil Eng — Jan-Feb 1939)
The military engineer in modern warfare. (Roy Eng Jour — Dec 1938)

ESTONIA (ARMY OF)

The Estonian army. (Mil-Woch — 10 Jun 1938)

EUROPE

Two hundred years of Europe. (RTC Jour — Jan 1939)

F**FORTIFICATIONS**

125 years ago: Engineers and fortresses during the Napoleonic era. (Pion — Aug 1938)
Unwanted fortresses. (Pion — Aug 1938)
The Hindenburg Line. (A Quar — Jan 1939)
Opposite the Maginot Line. (Pictures) (Inf Jour — Jan-Feb 1939)
"Discuss the dictum that the size of modern armies has rendered strategy wholly subordinate to tactics." (Jour USII — Oct 1938)
The platoon demolition equipment. (Mil Eng — Jan-Feb 1939)

FRANCE (ARMY OF)**Command and Staff**

The security of France. (Rv Mil Gen — Aug 1938)

Organization and Equipment

Tactical employment of the French large units. (Ras Cul Mil — Jul-Aug 1938)
The French army of 1870. (Rv d'Inf — Jun 1938)
Theorems of national defense. (Rv Mil Gen — Jul 1938)
What can one expect from modern antiaircraft artillery. (Rv Mil Gen — Aug 1938)
The defensive organization of the French overseas empire. (Rv Mil Gen — Sep 1938)
French principles for the employment of mechanized and motorized units and the defense against these. [See "Foreign Military Digests"]
Tanks in the attack: French and German tactical theories. (Jour RUSI — Nov 1938)
France and our expeditionary force. (US Rev — 15 Dec 1938)
Comparing the air strength of France and Germany. (US Rev — 29 Dec 1938)

Training

Tactical employment of the French large units. (Ras Cul Mil — Jul-Aug 1938)
A raid into the Vosges and Alsace. (Rv de Cav — Sep-Oct 1938)
Mounted across the masses of Aures. (Rv de Cav — Sep-Oct 1938)
The 10th Infantry Division on 30 and 31 August 1914. (Rv d'Inf — Jun, Jul 1938)
French principles for the employment of mechanized and motorized units and the defense against these. [See "Foreign Military Digests"]

G**GEOGRAPHY (MILITARY)**

National boundaries. (Mil Mitt — Aug 1938)
What might have happened. (Ftg Forc — Dec 1938)
Two hundred years of Europe. (RTC Jour — Jan 1939)

GERMANY (ARMY OF)**Command and Staff**

Military secrecy in Germany. (La France Mil — 18 Aug 1938)
Scharnhorst, Chief of the Engineer Corps 1810-1813. (Pion — Aug 1938)
Fitting the means to the ends. (FA Jour — Nov-Dec 1938)
Heligoland and the German colonies. (US Rev — 8 Dec 1938)
Ruthenia: high road between Germany and Roumania. (US Rev — 15 Dec 1938)
The mandated territories again. (US Rev — 29 Dec 1938)

Organization and Equipment

History of the Saxon Engineer Corps. (Pion — Aug 1938)
125 years of the Bavarian Pioneers. (Pion — Aug 1938)
Organization of the field service in the German Army. (Ras Cul Mil — Jul-Aug, Sep 1938)
Outline of German motorization. (Rv de Cav — Sep-Oct 1938)
The German artillery in combat. (FA Jour — Jan-Feb 1939)
Tanks in the attack: French and German tactical theories. (Jour RUSI — Nov 1938)
Russian reflections on the German Army. (RTC Jour — Jan 1939)
Effect of Nazi activities. (US Rev — 10 Nov 1938)
Comparing the air strength of France and Germany. (US Rev — 29 Dec 1938)

Training

Supply problems occurring in open warfare. (Mil-Woch — 3 Jun 1938)
Night combat training in Germany. (Rv d'Inf — Jun 1938)
The German artillery in combat. (FA Jour — Jan-Feb 1939)
An observer in Czechoslovakia during the crisis. (Ftg Forc — Dec 1938)
What might have happened. (Ftg Forc — Dec 1938)

GERMANY (NAVY OF)

German naval strategy of the World War. (Nav Inst Proc — Jan 1939)
The new German navy. (US Rev — 1 Dec 1938)

GREAT BRITAIN (ARMY OF)**Auxiliary Military Forces**

Australia's defences. (US Rev — 26 Jan 1939)

Command and Staff

British foreign policy. (Can Def Quar — Jan 1939)
Limited liability war. (Ftg Forc — Feb 1939)
The Mediterranean to-day. (Jour USII — Oct 1938)
Strategic islands on our sea routes. (US Rev — 9 Feb 1939)

History

Dictatorship in England: Some aspects of similarity between Cromwell and modern dictators. (RAF Quar — Jan 1939)

Organization and Equipment

Strength and weakness of the British Empire. (Rv Mil Gen — Aug 1938)
What price assault without support. (Can Def Quar — Jan 1939)
Oil supplies in time of war. (Can Def Quar — Jan 1939)
The training of a Territorial field ambulance in camp. (Jour RAMC — Jan 1939)
Two improvised operating tents. (Jour RAMC — Jan 1939)
What compulsory service means. (US Rev — 8 Dec 1938)
France and our expeditionary force. (US Rev — 15 Dec 1938)
Australia's defences. (US Rev — 26 Jan 1939)

Training

Maritime or continental? (Ftg Forc — Dec 1938)
Limited liability war. (Ftg Forc — Feb 1939)
The new infantry training, 1937. (Jour USII — Oct 1938)

GREAT BRITAIN (NAVY OF)

Oil supplies in time of war. (Can Def Quar — Jan 1939)

I**INFANTRY****Organization and Equipment**

The French army of 1870. (Rv d'Inf — Jun 1938)
Infantry and its armaments. (Rv Mil Suisse — Sep 1938)
French principles for the employment of mechanized and motorized units and the defense against these. [See "Foreign Military Digests"]
Russian principles for the employment of tank and motorized units and the defense against these. [See "Foreign Military Digests"]
The test division. (Res Off — Jan 1939)

Training Tactics

Night action of artillery. (Kras — 30 Sep 1938)
Infantry in night offense. (Kras — 2 Oct 1938)
The advance of the battalion. (Kras — 23 Oct 1938)
Historical example of troop leading. Example No. 4. (Mil-Woch — 20 May 1938)
Historical Example No. 5: Breaking off an attack. (Mil-Woch — 3 Jun 1938)
The 10th Infantry Division on 30 and 31 August 1914. (Rv d'Inf — Jun, Jul 1938)
Transportation and landing of an aerial infantry unit. (Rv d'Inf — Jul 1938)
Infantry in the Spanish War. (Rv Mil Gen — Sep 1938)
With reference to the speed of soldiers in combat. (Rv Mil Suisse — Aug 1938)
German opinions: Close combat. (Rv Mil Suisse — Aug 1938)
Lessons of the Spanish War. [See "Foreign Military Digests"]
Infantry in the breakthrough. [See "Foreign Military Digests"]
French principles for the employment of mechanized and motorized units and the defense against these. [See "Foreign Military Digests"]
Russian principles for the employment of tank and motorized units and the defense against these. [See "Foreign Military Digests"]
The new infantry training, 1937. (Jour USII — Oct 1938)

INTELLIGENCE (MILITARY)

Military secrecy in Germany. (La France Mil — 18 Aug 1938)

INTERNATIONAL RELATIONS

Political and military review during the second quarter of 1938. (Mil Mitt — Jul 1938)
The inner nature of war. (A Quar — Jan 1939)
The Soviet-Spanish War to September, 1938. (A Quar — Jan 1939)
A national defense programme for the United States. (Can Def Quar — Jan 1939)
British foreign policy. (Can Def Quar — Jan 1939)
An observer in Czechoslovakia during the crisis. (Ftg Forc — Dec 1938)
The Mediterranean to-day. (Jour USII — Oct 1938)
After Munich, what? Armistice Day reverie, 1938. (Mil Eng — Jan-Feb 1939)
Appraising our neutrality. (Nav Inst Proc — Dec 1938)
Between wars in the Far East. (Nav Inst Proc — Jan 1939)
A look into Europe. (QM Rev — Nov-Dec 1938)
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T

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ENGINEERS

The Hindenburg Line. (A Quar — Jan 1939)
 The military engineer in modern warfare. (Jour RUSI — Nov 1938)

INFANTRY

Historical example of troop leading. Example No. 4. (Mil-Woch — 20 May 1938)
 Historical Example No. 5: Breaking off an attack. (Mil-Woch — Jun 1938)
 Historical example in troop leading: A counterattack. (Mil-Woch — 24 Jun 1938)
 The 10th Infantry Division on 30 and 31 August 1914. (Rv d'Inf — Jun, Jul 1938)

TANKS

Defense against armored vehicles. (Mil-Woch — 3 Jun 1938)
 What does Palestine prove? (Cav Jour — Jan-Feb 1939)
 The Battle of Cambrai. (RTC Jour — Jan 1939)

H — Military Conduct of the War in the Field

The first of my two missions in Russia during the World War. (Bul Belge Mil — Sep 1938)
 The bombardment of the railway viaduct at Sablici (Italian front, east of Monfalcone) 9 January 1916. (Mil Mitt — Aug 1938)
 Supply of the Austro-Hungarian Balkan Forces during the autumn offensive of 1914, in Serbia. (Mil Mitt — Sep 1938)
 Historical Example No. 5: Breaking off an attack. (Mil-Woch — 3 Jun 1938)
 Joint action of the combat arms: Artillery reconnaissance. (Mil-Woch — 17, 24 Jun 1938)
 Attack by highly mobile troops against the enemy flank and defense against same. (Mil-Woch — 24 Jun 1938)
 Historical example in troop leading: A counterattack. (Mil-Woch — 24 Jun 1938)
 The Battle of the Piave. (Ras Cul Mil — Jul-Aug 1938)
 The Battle of the Piave, June 1918, according to the Official Austrian account. (Ras Cul Mil — Jul-Aug, Sep 1938)
 Ludendorff. (Ras Cul Mil — Sep 1938)
 General Rennenkampf and the Battle of Tannenberg. (Rv Mil Gen — Jul 1938)
 The Battle of June 1918, in Italy. (Rv Mil Gen — Sep 1938)
 The Hindenburg Line. (A Quar — Jan 1939)
 Fitting the means to the ends. (FA Jour — Nov-Dec 1938)
 "Discuss the dictum that the size of modern armies has rendered strategy wholly subordinate to tactics." (Jour USII — Oct 1938)
 A great failure. The Austrian offensive of 1916 in the Trentino. (RAF Quar — Jan 1939)
 The Battle of Cambrai. (RTC Jour — Jan 1939)

J — Campaigns and Battles

ASIATIC AREA — TURKISH THEATER

Palestine Front

What does Palestine prove? (Cav Jour — Jan-Feb 1939)

EUROPEAN AREA — BALKAN THEATER

Serbian Front

Supply of the Austro-Hungarian Balkan Forces during the autumn offensive of 1914, in Serbia. (Mil Mitt — Sep 1938)

EUROPEAN AREA — ITALIAN THEATER

The bombardment of the railway viaduct at Sablici (Italian front, east of Monfalcone) 9 January 1916. (Mil Mitt — Aug 1938)
 The Battle of the Piave. (Ras Cul Mil — Jul-Aug 1938)
 The Battle of the Piave, June 1918, according to the Official Austrian account. (Ras Cul Mil — Jul-Aug, Sep 1938)
 The Battle of June 1918, in Italy. (Rv Mil Gen — Sep 1938)
 A great failure. The Austrian offensive of 1916 in the Trentino. (RAF Quar — Jan 1939)

EUROPEAN AREA — RUSSIAN THEATER

The first of my two missions in Russia during the World War. (Bul Belge Mil — Sep 1938)
 Historical example of troop leading. Example No. 4. (Mil-Woch — 20 May 1938)
 Historical Example No. 5: Breaking off an attack. (Mil-Woch — 3 Jun 1938)
 Attack by highly mobile troops against the enemy flank and defense against same. (Mil-Woch — 24 Jun 1938)
 Historical examples of battles for rivers. (Pion — Aug 1938)
 Ludendorff. (Ras Cul Mil — Sep 1938)
 General Rennenkampf and the Battle of Tannenberg. (Rv Mil Gen — Jul 1938)
 "Discuss the dictum that the size of modern armies has rendered strategy wholly subordinate to tactics." (Jour USII — Oct 1938)

EUROPEAN AREA — WESTERN THEATER

"Discuss the dictum that the size of modern armies has rendered strategy wholly subordinate to tactics." (Jour USII — Oct 1938)

1914

Historical examples of battles for rivers. (Pion — Aug 1938)
 The 10th Infantry Division on 30 and 31 August 1914. (Rv d'Inf — Jun, Jul 1938)
 The military engineer in modern warfare. (Jour RUSI — Nov 1938)

1917

The Hindenburg Line. (A Quar — Jan 1939)
 The Battle of Cambrai. (RTC Jour — Jan 1939)

1918

Historical example in troop leading: A counterattack. (Mil-Woch — 24 Jun 1938)

L — Naval History

The battle of Skagerrack as viewed by an American critic. (Mil-Woch — 3 Jun 1938)
 German naval strategy of the World War. (Nav Inst Proc — Jan 1939)

WEAPONS

The hand grenade in combat. (Kras — 4 Oct 1938)
 Reflections on armament problems. (Rv Mil Gen — Jul 1938)
 Infantry in the Spanish War. (Rv Mil Gen — Sep 1938)
 Regarding our artillery matériel. (Rv Mil Suisse — Sep 1938)
 Infantry and its armaments. (Rv Mil Suisse — Sep 1938)
 Field gun and light field howitzer. (Wehr Monat — Jul 1938)
 From "Bomb Cannon" to infantry cannon. (Wehr Monat — Jul 1938)
 The employment of supporting arms in the Spanish Civil War. [See "Original Military Study"]
 Arms for the army. (A Ord — Jan-Feb 1939)
 Commencing a modern war. (FA Jour — Jan-Feb 1939)
 The race for air armament. (US Rev — 1 Dec 1938)
 Copenhagen guns. (US Rev — 5, 12 Jan 1939)
 The new American service rifle. (US Rev — 2 Feb 1939)

WITHDRAWAL

Impressions as to the functions of an air force during the pursuit of retreating ground troops. (Mil-Woch — 20 May 1938)
 The Hindenburg Line. (A Quar — Jan 1939)
 The military engineer in modern warfare. (Jour RUSI — Nov 1938)



U.S.A. Signal Corps

"Antiaircraft batteries were born in the great war. Now, as at the end of the struggle, they form a definite and recognized unit of defense, the importance of which grows more vital every day."

—Robert Rax, Army Quarterly, July 1938.

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You will find, among other items, on the reverse of the Officers' Efficiency Report form (W.D., A.G.O. Form No. 67 — July 1, 1936, the following:

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We claim that unless an officer subscribes to and studies The Command and General Staff School Quarterly this important question cannot be answered in the affirmative.

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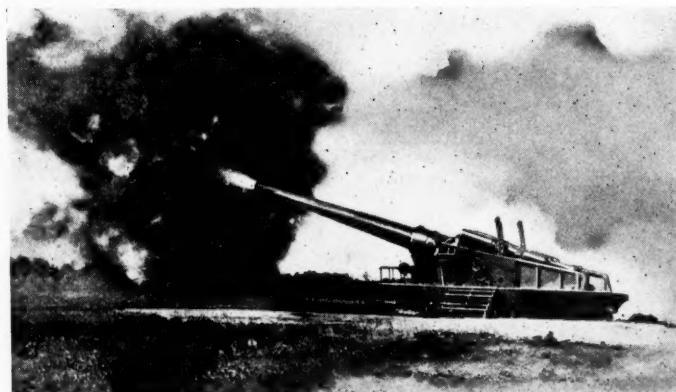
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Ordnance



THE FIRST HOME OF THE GENERAL SERVICE SCHOOLS, 1881

HISTORY OF THE COMMAND AND GENERAL STAFF SCHOOL



PART I

In time of war, it is seldom that a military leader finds himself at the head of troops in which the state of training of officers and men is ideal. Usually, circumstances have left many defects in this training, and the leader must conduct immediate operations with the troops as he finds them. However, he is very conscious of their training defects, and if at the end of the war he is charged with duties connected with army reorganization, he has quite definite plans for training improvement during time of peace.

After the Civil War, Generals Grant, Sherman, and Sheridan gave their attention to the problems of army reorganization and military education. During the war, they had seen enough of deficiencies in tactical leadership, and of confusion in giving orders, both in written and oral form, to emphasize the fact that officers who would command with success must add thorough military education to personal qualities of leadership.

Army leaders sought in education a means of rekindling enthusiasm and esprit. Post schools were established at the various garrisons. The Artillery School which had been established at Fortress Monroe, Virginia, on 5 April, 1824, for the instruction of artillery officers, continued in operation. It is recalled that the school which had been started by Colonel Leavenworth at Jefferson Barracks, Missouri, in 1826, as a "School for the Instruction of Infantry" had been abandoned in 1828, so the necessity for practical instruction of infantry and cavalry officers with forces larger than those to be found at the scattered posts was apparent.

General Sherman took a great step in supplying the immediate educational needs of the Army and in laying the foundation of our splendid system of advanced military training, when on the fifty-fourth anniversary of the establishment of Fort Leavenworth, as Commander of the Army of the United States, he issued the following General Orders No. 42 of 1881:

HEADQUARTERS OF THE ARMY ADJUTANT GENERAL'S OFFICE

WASHINGTON, May 7, 1881.

GENERAL ORDERS }
No. 42 }

As soon as the requisite number of troops can be assembled at Fort Leavenworth, Kansas, the commanding

general Department of the Missouri will take measures to establish a school of application for infantry and cavalry similar to the one now in operation for the artillery at Fortress Monroe, Virginia, the code of regulation for which, so far as applicable, will be observed until the staff of the school can prepare and submit an amended code for the approval of the General of the Army.

The school will habitually consist of three field officers of cavalry or infantry, with not less than four companies of infantry, four troops of cavalry, one light battery of artillery and the officers attached for instruction as hereinafter described. * * *

The senior field officer, present for duty, will command the school and the next five officers in rank will compose the staff of the school. All officers will purchase their own textbooks and stationery, but other expenses will be defrayed out of the post fund so far as existing Army Regulations permit, except blackboards, desks, tables, chairs, furniture, etc., which will be supplied by the Quartermaster's Department on requisition made by the commanding officer, approved by the department commander.

The school will at all times be governed by the rules of discipline prescribed for all military posts, and will be subject to inspection by the department and division commanders; but in matters purely pertaining to the *course of instruction*, will be exclusively subject to the orders of the General of the Army.

BY COMMAND OF GENERAL SHERMAN,

R. C. DRUM,
Adjutant General.



General Philip Sheridan was in command of the Division of the Missouri in 1881, with headquarters at Chicago, and within his division, Major General John Pope with headquarters at Fort Leavenworth commanded the Department of the Missouri. The duty of initiating the work of establishing the new school devolved upon these commanders.

(To be continued)

